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THE HISTORY AND ECONOMICS OF TRANSPORT

BY

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OF THE EMPIRE "

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FOURTH EDITION



LONDON

SIR ISAAC PITMAN & SONS, LTD.
PARKER STREET, KINGSWAY, W.C.2
BATH, MELBOURNE, TORONTO, NEW YORK

1927

FIRST EDITION	1915
SECOND EDITION.	1920
THIRD EDITION	1924
FOURTH EDITION (THOROUGHLY REVISED)	1927

PREFACE TO THE FOURTH EDITION

THE exhaustion of the second edition coincided with the putting into force of the Railway Act of 1921. The principal additions to that volume were Part IV, which contained a consideration of the new Railway Act and an explanation of its main provisions. Seven new appendices dealing with the Act were included.

That a fourth edition is needed so soon has encouraged the authors to revise thoroughly and co-ordinate the additions since the original issued in 1915 ; they have also brought the whole subject, so far as possible, up to the present year.

The authors are very gratified with the reception this book has received, and by its extensive use in Universities and other teaching institutions.

PREFACE

TRANSPORT problems are not of recent origin. In one form or another they have arisen ever since man had any goods to move from place to place, and as transport has become more completely organised they have provoked increasing controversy. Nor can it be said that their solution has never been attempted. In the railway period alone Parliament and traders have given much time to their elucidation. But it is only in recent years that they have been systematically studied. The new Universities and Schools of Economics having included the subject of transport in the curriculum for their commerce degrees, it has come to be treated as a branch of economics deserving of accurate, scientific inquiry and study. The aim of this volume is to assist this study, and consequently much that has been written is elementary. There is also much that, necessarily, is sketchy, because, with a subject so comprehensive, it has been found impossible to deal in detail with every branch ; to have done so would have required several volumes. There is much also that, inevitably, touches controversial ground. Where this is so an attempt has been made to present both sides of the question as fairly and as adequately as possible. But while the primary aim has been to produce a textbook for the student, the authors hope that it will be found interesting to the general reader, particularly to the business man whose daily affairs bring him into close contact with the problems of transport.

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THE HISTORY AND ECONOMICS OF TRANSPORT

INTRODUCTION

METHODS OF TRANSPORT AND THEIR DEVELOPMENT

CHAPTER I

THE LAND OR THE WATER ROUTE

EVER since trade and commerce necessitated the transport of goods the same problem has confronted the trader. With improved methods and greater knowledge of forces giving increased power over physical conditions, the terms of the problem have been modified. But the primitive trader of many centuries ago debated the same questions as does the twentieth century merchant in the Midlands to-day : Shall I send my goods by land or by water ? By the land road or the water road ; by the wagon on the turnpike, or by the barge on the canal ; by the railway, or by an improved canal method—these under different forms are practically the same question, which has demanded an answer from the trader of antiquity, the eighteenth century factor, and the captain of industry to-day.

Nor is this question, which to the superficial observer appears so simple, easy to answer. The closer one looks into the subject the greater do its possibilities and complexities grow. When the primitive trader had a few goods to transport a few miles he might, or might not, have the choice of routes. If, however, he lived on the banks of a river, or lake, or by the sea, he enjoyed the advantage of the choice. If, for instance, one were to imagine a trader living on the side of a lake and having some goods to send to a settlement 10 miles distant, yet close

to the lake, will he send those goods by road or by water? It is frequently possible to get a clearer understanding of the problems of to-day, by going back to simpler times, and there view the problem shorn of the complications inherent in some modern methods. In the case now under consideration the trader knows that if the goods are sent by land there must be a roadway of some sort along which the beast of burden or the primitive vehicle can travel. If the shores of the lake are densely wooded, or marshy, it will be necessary first of all to make a road either by cutting a way through the trees and levelling a track, or by constructing a causeway through the marsh along which man or beast can safely travel. When this roadway is available it will next be necessary to decide how the goods shall be transported along it. If the roadway be level and smooth a simple sledge drawn by horse or ox may meet the case; or the trader may have been introduced to the wonders of the wheel, and by constructing a rough cart mounted on an axle with two wheels he may ease the labour for his horse or ox very considerably.

The point to note is that if he decide to transport the goods by land two questions have to be answered—is there a suitable road, and what shall convey the goods over the road? In other words, man has to provide both a road and a vehicle. But in the case under consideration the trader is living on the shores of a lake, and as the destination of the goods is near the lake there is an alternative route. Now this route differs in almost every respect from the other. In the first place the roadway is ready for use. There are no trees to cut down or a morass to be rendered traversable. Nature has freely provided a level, easily traversed roadway, and for the use of this, all that the trader need do is to construct some type of boat or craft that will float.

To primitive man living near river, lake or sea, the water road offered many considerable advantages over the land road. And it is fairly certain that, under the conditions stated, the invention of the coracle preceded the invention of the cart.

Throughout commercial history it is safe to say that, taken as a whole, water transport has been cheaper than land transport. Nor is the reason far to seek. Not only has the land road to be constructed, and this frequently entails great labour and expense,

but it has to be kept in a state of repair. An untended road sooner or later relapses into an impassable condition. Even the

Roman roads, so solidly constructed that they could

**Comparative Cost
of Water and Land
Transport.**

almost defy the ravages of Nature and of time, have, except where they have been continually in use and

on the whole kept in a fair state of repair, disappeared from view under natural growths, the removal of which would

be almost as costly as the construction of new roads. The water road of lake, river, or sea, with the natural modifications worked by time, changes but little during the history of a nation. There may be a certain amount of silting up or change of course, or modifications caused by erosion, but on the whole it may be said that the natural road enjoys a permanency quite foreign to any human attempts at road-making on land. The modern example of this fact can be illustrated by studying the capital outlay required for a railway company and a steamship company of the present time. The largest railway group of the United Kingdom is saddled with a capital of upwards of £400,000,000 sterling; but there is not a single British shipping company whose capital even approximates to £20,000,000. And the total value of the mercantile¹ marine of the United Kingdom, which comprises no less than 19,400,000 tons of shipping, is only about £250,000,000. Yet this shipping carries on somewhere about one-half of the ocean transport business of the whole world. If an analysis be made of the capital of a railway and steamship company, the cause of this great disproportionate need for capital very soon emerges. The cost of the rolling stock of the railway company is comparatively small. The items in the capital account, which have consumed the great mass of capital, are, in the first place, the survey of the route, then the Parliamentary expenses connected with getting the charter, and finally the purchase price of the land, and the making good of damage. In a word, it is the preliminary expenses in getting the scheme approved, the purchase of land, and the construction of the permanent way that have bulked in capital expenditure. Thus, while the capital of the railways in the United Kingdom now stands at something less than £1,200,000,000, about two-thirds of this vast sum has been spent in securing the roadway. It is not to be wondered, then, that there can be no comparison or equality between railway rates and steamship freights.

¹ Lloyd's Register, 1926.

The modern world has to sink large quantities of capital to secure a modern land road. The ancient world had to put forth great efforts to construct even a suitable track for the transport of weighty commodities. The amount of capital sunk in ancient roads was probably never either considered, estimated, or even approximately totalled up. The labour employed was forced or slave labour, and the materials were obtained by this labour from the nearest source of supply. What counted in those days was the effort or trouble entailed in procuring the facility afforded by a good road. Thus, if there was an alternative water route, mankind naturally gave its attention rather to the improvement of the water route vehicle than to the comparatively greater work of making a land road.

Cost of Roads.

The first water vehicle may have been a raft rudely constructed by fixing a number of tree trunks together. But this was a cumbersome machine, difficult to control and slow of speed.

Early Water Vehicles.

It would soon be superseded by the coracle. This craft, which played a considerable and useful part in the early history of these islands, was an ingenious invention. It was possibly suggested to some talented savage when he noted that the skins of animals would float. Eventually a craft was constructed by making a wicker framework and covering it with skins. The coracle is the earliest water-craft known in the history of the British Isles, and has survived almost in its original form down to the present day. On the Dee, and the Severn, these craft, the outer covering, perhaps, being tarred canvas instead of skins, can still be seen; whilst in some parts of Ireland the type of craft used has scarcely changed since the days of St. Columba. In these slender craft long voyages were undertaken. There is on record a seven days' voyage by three Irish missionaries who travelled in a coracle from Ireland to Cornwall. Julius Caesar realised the convenience of these craft, which apparently he saw for the first time in Britain. He had some coracles constructed and gives an interesting description of their build. They had gunwales and keels of strong, light wood, and the framing between these was of wicker work. The result was a boat-shaped basket which was covered with the skins of horses or oxen. Such a craft was light, and so was easily portable; it would stand a considerable amount of hard usage, and was very durable. Small coracles were

covered with one skin, but larger craft were constructed, which required two, three or more skins to cover them. There is a curious and very interesting survival of the coracle in present-day ship-building technical terms. Where more than one skin was required to cover the wicker framework, there was a seam that had to be made water-tight. Thus, in the construction of these primitive craft there was the skin and the seam. These two terms have persisted right down to the present. The ocean liner also has a skin, *i.e.*, the outer plating, and where the plates are butted or riveted there are *seams* that have to be caulked to render them water-tight. The skin and seam of the early craft are thus commemorated, although few things could be less alike than the steel plating of a modern steamship and the hide covering of a coracle.

When mankind produced more efficient tools, and was able to burn down or cut down a giant tree, the possibility of making the tree into a boat soon occurred to some quick-witted native. Probably fire was used to hollow out the tree, and form a bow and a stern. The wooden canoe became a practical fact and with this the adaptation of wood to ship or boat-building began. A canoe hollowed out of a tree was a cumbersome affair compared with a coracle. Thus, as soon as it was found possible to split trees into thin planks, the framework of the coracle was somewhat modified, and, in place of the hide covering, thin planks were used. But as yet there were no such things as nails or rivets, so the planks were sewn together as the edges of the hides had been. There was still, in the true sense of the word, a seam. Wooden boats with the seams sewn together, instead of being nailed, can still be seen in Northern Europe.

With the introduction of wood as the material for shipbuilding very great possibilities opened out before the shipbuilder and trader.

The dimensions of the ship could be enormously increased. This necessitated, however, many modifications, in form, construction, propelling force, and method of steering. But it was no great distance from the first clinker-built boat to the Viking ship—a craft prepared, under the conditions of water transport in those far-off days, to go anywhere and do anything. The long, swift Viking ship could not only cross to England or Ireland but could brave the crossing of the Bay of Biscay (or coast round it), and passing through the Straits

Evolution of the Boat.

The Growth of the Ship.

of Gibraltar it became a familiar object on the Mediterranean. Or to put it in another way, the improvement of the coracle to the Viking ship made international trading possible.

This evolution did not take place in one part of the world and then spread abroad. So far as can be gathered from survivals of early

**Widespread
Evolution.**

craft in different parts of the world, a very similar evolution took place in widely separate countries and continents. Both in the Far East and the Far West serviceable sea craft were produced, and as mankind settled down after having passed through the hunting and pastoral stages to the more civilised stage of agriculture, and had quantities of food-stuffs and raw materials of various kinds with which to traffic, the vehicle suitable for early trade was also available.

Thus trading began and continued to develop, a growing commerce requiring a larger vehicle which led to the oar first being supplemented, and finally displaced by the sail.

CHAPTER II

ENGLISH ROADS

IN a very few pages the evolution of water craft over many centuries has been sketched. Meantime land transport had also made ad-

The Wheeled Vehicle.

vances, and both road and vehicle had been subject to many improvements. It would be the rolling of a log that first suggested the possibility of easing the labour of haulage by using a roller or wheel. The facility thus gained would lead on to other attempts being made to assist the work of transport. The roller, whilst diminishing the heavy work of the haulier, was slow, because of the ever-recurring necessity of replacing the roller. This inconvenience doubtless led to the invention of the axle, and when once a freely rotating, yet fixed, roller or wheel was evolved the dimensions of the diameter of the wheel would soon increase. The original roller would be the trunk of a medium sized tree, and when once the principle of the action of the wheel had been grasped, sections of larger trees would be experimented with, until the solid built wheel would come into use.

When Caesar invaded Britain in the year 55 B.C., he found the war-chariot in use. This was a two-wheeled car, of which the axles were prolonged, and fitted with scythes for the

Antiquity of Wheeled Vehicles in Britain.

purpose of crippling the enemy when a charge was attempted. The wheels of these chariots would be constructed of solid wood, perhaps bound with metal ; centuries were to elapse before the spoke-built wheel would come into general use, but drawings of the eleventh century show carts mounted on wheels of very similar appearance to those fitted to present-day country carts. It is evident, however, from Caesar's descriptions, that two-wheeled vehicles and hence roads of a more or less primitive type have been in use in this country, at any rate throughout the Christian era.

The coming of the Romans was to have an important effect on methods of transport, for the Romans were great road engineers. Road-making was an essential feature in their policy for maintaining their hold over the countries they conquered. Nor was an exception made in the case of Britain.

Roman Roads.

Throughout the Island—north, south, east, and west—wherever the Roman went he left an indelible mark in the form of roads. After 2,000 years of hard wear many hundreds of miles of these roads are still in use. Other parts of the system have been overgrown or covered with wood, but even these could apparently be restored, for recently the suggestion has been made that the disused Roman roads should be opened out for motor traffic. The rough tracks of the primitive inhabitants had developed in some cases into broad clearings through the woods and forests, forming roadways which afforded a means of communication throughout the Island. It was this system of communication that the Romans, during their occupation of Britain, improved, straightened, constructed and developed. The main routes eventually were—

“1. The Watling Street, leading to Ireland, and starting from Richborough by London and Worcester to Festiniog. Thence it had two branches—the left to Carnarvon, the right by Chester, Manchester and Corbridge to Cramond, Jedburgh, and the North.

“2. The Ikenield Street, from the country of the Iceni (about the Wash and Yorkshire) by Newmarket and Dunstable to Streatley. Here it branched—the right by the Berkshire Ridgeway to Avebury; the left by Newbury and Tangley to Old Sarum, Dorchester, Honiton, Exeter, Totnes, and the Land's End.

“3. Akeman Street, from the eastern counties by Bedford, Buckingham, Alcester, Woodstock, Cirencester, Aust (where it crossed the Severn), Caerleon, Cardiff, Caermarthen, and St. David's.

“4. Ryknield Street, from the Tyne by Bruchester, Boroughbridge, Aldborough, Ribston, Bolton, Chesterfield, Burton Wall, Birmingham, Tewkesbury, Gloucester, Chepstow, and so by Abergavenny and Caermarthen to St. David's.

“5. Ermyn Street, from East Scotland by Berwick, Bampton, Corbridge to Catarick, where it divided; the western branch along the Ryknield Way to Aldborough, Houghton, Doncaster, Southwell and Staveley, where it rejoined its own Eastern branch which had proceeded from Catarick by Northallerton, Stamford Bridge, South Cave, Lincoln, Ancaster, and near Witham.

“Thence the road ran to near Stamford, Chesterton, Royston, Ware Park, Enfield and Wood Green to London.

“Here it again divided—the western branch by Dorking and

Pullborough to Chichester ; the easterly by Bromley, Tunbridge, Wadhurst and Eastbourne to Pevensey.

"Two subordinate roads are also mentioned by Sir Richard Colt Hoare—

"6. The Fosse Way, from about Seaton by Ilchester, Bath, Cirencester, Northleach, Claychester, to Lincoln.

"7. The Via Julia, mentioned both by Antonine and Richard of Cirencester, from Bath, Bilton, Caerwent, Caerleon, Cowbridge, Neath, and Caermarthen to St. David's."¹

In the year 410 A.D. the Romans withdrew from Britain, and the British found themselves confronted with an enemy against whom they could make but a fitful and unsatisfactory resistance. Within half a century the Jutes and Saxons had established themselves in the south, and within another century the whole of the east and south-east coasts were in the hands of the Angles, Saxons, and Jutes. The British were driven steadily westward until finally the conquest was complete, and the various groups of invaders began to strive among themselves for the mastery. When this was decided other invaders entered upon the scene, nor was it until the Norman Conquest that the country enjoyed a cessation from serious outside attack.

**Slow Development
after Roman
Period.**

All these centuries of strife and uncertainty were ill calculated to assist in the development of either internal or external trade. Indeed, the roads for the most part were allowed to go to ruin, although the *Trinoda Necessitas* compelled freemen to maintain bridges—the three compulsory works being repair of bridges and fortifications and personal service in the fyrd or militia. Thus such transport as existed was carried on either by land or by water under the greatest difficulties.

But with the coming of the Normans, and the constant going and coming of the conquerors between the Continental and English divisions of their kingdom, the routes to the more convenient seaports on the south coast were improved. Hence by the time the Plantagenets were on the throne the main roads connecting London with the seaports for the Continent were in fair condition. But northward and westward communication was difficult and remained so for some centuries. Parts

Norman Period.

¹ *Social England*, vol. i, pp. 49, 50.

of the old *streets* were either still in use or had been repaired, but the main traffic of the country continued to be carried on by means of pack animals.

Thus the trading routes were *Holloways*. These had originally been tracks cleared of obstruction or made traversable where morass

“Holloways.” succeeded the generally prevailing wood. There was no attempt, however, at road construction, and as a consequence these tracks became more and more deeply worn—hence the name *Holloways*. In some places they were worn to such an extent that the pack animals going along them were barely visible to people on the level. In the winter time such tracks would fill with water, and, if the season was severe, would be frozen hard; in either case the passage-way along them was obstructed. There are still survivals of these *Holloways* in many of our old towns. The place at which the *way* entered the town was the *Holloway* head, a name that still lingers; in London it has given a name to a large district.

The difficulty connected with the transport of goods under such conditions can be more easily imagined than described. But

Stimulus to Foreign Trade. undoubtedly it was a great factor in stimulating the importation of foreign manufactured goods, which could be brought within reasonable distance of most

market towns or fairs by the water road. Thus it is not to be wondered at that English manufactures stagnated, and that until the rise of the Mercantilists, whose policy it was to make the nation powerful and self-sufficing, England merely produced raw materials for continental craftsmen to manufacture.

From the reign of Edward III, however, a new policy was gradually evolved. The Government became increasingly ambitious; but

Expansion of Home Trade. an ambitious policy was found to be an expensive policy, and the old financial arrangements for supporting the King and administrative services were

no longer adequate. In the words of the Chroniclers the King could no longer live of his own. The rents and services of the royal demesne were insufficient either to protect the old Norman possessions of the King of England on the Continent, or to enable Edward III to make good his fatuous claim to the Crown of France. Henry II had substituted money payments for personal service, and owing to this it became necessary to increase money taxes. For that

purpose a taxable fund had to be created, for it did not then exist. Thus King and Government looking round to discover where money was made saw that the manufacturing industries of Flanders were producing what appeared to them to be so necessary for the progress and well-being of England. It had previously been the experience of the Sheriffs that in collecting taxes, money was more easily extracted from townsmen than from agriculturalists; so now a new fiscal policy was introduced. The raw materials must be retained in the country and worked up at home. As English craftsmen were lacking, advantages were offered to foreign craftsmen, who, in return for bringing their skill and setting up their industries in England, were granted special concessions. This policy, which continued right on to late Tudor days, resulted in developing many valuable manufacturing industries in this country and with the introduction of each new industry the demands on the means of communication and transport increased. Thus it was that King and Government began to foster trade and commerce. Originally trade was to be the servant of the State, providing the sinews of war to support a spirited foreign policy. It is interesting to note that, as the centuries passed, this position became reversed, until in the middle of the eighteenth century, a British minister was to declare: "I am conquering Canada in the plains of Germany." Or in other words, trade from having been the servant of the military party had become its master. The Wars of the Plantagenets and Lancastrians were waged for the sake of chivalry and military display: the wars of modern England have been waged in the interests of trade, colonisation, and progress—three terms which are practically synonymous in their significance.

With increasing manufactures and trade it became necessary to improve transport methods. Thus roads, wagons, boats, and ships

Improvement of Transport.

all began to feel the effects of growing demands on their services. Hence in the reign of Edward III commenced the system of charging tolls for the use of roads, the theory being that the toll collected should be sufficient to keep the road in repair, and even extend its length. Efforts had been made by statute to remedy the bad roads of the country, but the toll system was for a considerable period found to be the most efficacious method of providing the necessary funds for both their construction and their maintenance.

It was in the year 1346 that Parliament authorised the levying of the first toll on an English road. And when the road for which

First Tolls. the special legislation was passed is known, a clear light is thrown over the condition of communication

in this country. The road in question led from St. Giles-in-the-Fields to the village of Charing, now central London ; it continued from Charing to Temple Bar, and turning northward went along Perpoole, which gives the line now occupied by Grays Inn Road. According to the Act the footpath at Temple Bar was overgrown, and during spells of bad weather was impassable. We read in the ordinary history books long descriptions of Edward III and his chivalry ; the Act just cited reveals the less satisfactory side of the picture, for we learn that when Edward rode down to Parliament, such was the unevenness of the roads in Westminster that the ruts and holes had to be filled with faggots to make a passage for the Royal procession.

If this was the state of the highways at the centre of Government, it can easily be imagined what the roads were like away from London. In fact, the farther one went from London the greater were the difficulties of travel ; and this continued to be the case until well into the eighteenth century.

Much can be learned as to the means of communication about the country and the difficulties experienced by travellers and merchants by going through the proceedings of Parliament. During Tudor times some of the statutes are very interesting from this point of view. Even

**Condition of
Early Roads.**

in parts of the country like Kent and Sussex, where one might have expected to find roads and tracks fairly good, owing to the extent of the intercourse between England and the Continent, there is evidence that they were deplorably bad. There are instances where Parliament was asked for permission to construct new tracks, the old ones having become so impassable that they were reported as being beyond repair, and the only course was to construct new roads.

Trade and commerce were thriving during the sixteenth century.

**Highway
Surveyors.**

Englishmen were *finding* themselves, and taking their position at the head of those developments in trade and discovery which were to result in the building up of the Empire with which the twentieth century is

familiar. Its foundations were laid then, and it was then, too, that an energetic policy in several spheres began to reveal to the world a new force, the English gentleman-trader. If the activities of these men were to have full scope there must be greater ease in getting about the country. Goods carried in panniers from manufacturing centres to the coast were not a fit complement to the system of import and export trade at the ports. Unhappy as were the days of Queen Mary, the need to supply the country with roads fit for cart traffic forced itself upon the attention of people and Government. Thus, in the year 1555, Parliament passed a law to the effect that every parish should appoint two surveyors of the highways, whose duty it should be to maintain the roads in their district, and for this purpose they were empowered to employ compulsory labour.

The great interest in tracing out the gradual improvement in the road system of England is that it provides a clear and unmistakable illustration of the integration of industries ; **Improved Roads.** indeed, one might go farther and say the integration of all that is best in the forces working for the material and the intellectual well-being of the community. To have mapped out the country during the sixteenth century with a system of first-class roads, and to have carried out the scheme, would not have been possible. The country was comparatively poor, and was only sparsely inhabited. Neither the population nor the accumulated wealth could have borne the strain entailed by the carrying through of a big scheme of road construction. As population and wealth increased, as trade and its needs developed, so one can trace small improvements in methods in various and differing spheres. These small advances tended to increase with an astonishing celerity as the decades passed, until when George Stephenson, by the invention of the forced draught, perfected the locomotive engine, all the other departments of human activity had developed up to the point at which it was necessary for them to be, if that invention was to be rightly applied and its benefits fully enjoyed. Thus population, manufacture, trade, capital, scientific knowledge, practical skill, and other necessary spheres had all evolved to an extent that enabled them to take advantage of the new possibility. George Stephenson and his inventions would have been before their time in the sixteenth century, but within three centuries the world

was ready for him, and his work completed the work of one epoch, and laid the foundation of another. Without the foundational work of Tudor and Stuart days the nineteenth century engineer and scientist would have been as "voices crying in the wilderness." Each age has its special work, nor is any part of that work unnecessary in the great scheme of evolution. A study of the history of civilisation convinces one not only of integration working in every great sphere of human activity, but of a more complete and far-reaching integration which links all spheres, and makes their evolution contingent on the steady advance of all.

CHAPTER III

THE INSUFFICIENCY OF THE TURNPIKE ROAD

FROM the general, however, one must return to the particular, and sketch out the development of the means of internal communication

Modern Development. in this country from the seventeenth century. Nor is the narration of this of merely historical interest.

One learns that each advance made in methods of travel—the coach, the train, the cycle, the motor, aircraft—has often, in the first instance, been a luxury for the rich or a plaything for the venturesome. And that after many a test, and sometimes through much exaggeration (*e.g.*, the racing motor), it has become eventually the heritage of the poorest, giving means of enjoyment and pleasure, and the possibility of carrying on business and commerce under new conditions, and at a cost that brings its benefits within the reach of all.

About the middle of the seventeenth century, the means of travelling in England were revolutionised. A stage-coach travelling

The Stage Coach. at four miles an hour would raise a smile to-day, but when it was introduced into this country it was considered a great innovation.

At first the stages were only in operation on the best roads in the vicinity of London. But in the year 1663 a stage-coach system was organised to as far north as Preston. As the vehicle itself was only a superior kind of wagon with no springs, and travelling over roads of a corduroy description, the experiences of those making use of the service were anything but happy. Nor did the public welcome the advent of the coach. The Londoner, always apt in his descriptions, named these coaches "Hell Carts," and as a dangerous innovation likely to cause injury to the public at large, there was some demand that they should be prohibited.

Coaching was not only a slow and tedious business, but was attended by some danger ; especially was this the case during bad

Risks of Coaching. weather, when the wretched roads along which they had to function were apt to suffer from flooding.

The management apparently was conscious of the risks attending even moderate journeys, for the bills announcing the various

coaching services usually contained a sentence to the effect that the coach would start, "God willing," at a given time, or when the majority of passengers should decide. Nor is such a safeguard to be wondered at when one realises that, in the year 1700, the time required to journey by coach from London to York was a week. To-day a second rate railway service manages to effect the run between London and Tunbridge Wells in about an hour ; then by coach it required two days. To get to Scotland then was more difficult than to go to India now. In the year 1763 it took no less than a fortnight to reach Edinburgh from London, and the coach attempted that feat only twelve times a year. What an undertaking a long coach journey was during the eighteenth century can be realised by the fact that tools and arms had to be carried, the former being necessary at times to clear a road, or repair a breakdown caused by the roughness of the way, the latter for the protection of life and goods against the depredations of highwaymen. When speed was an object people rode. Commercial travellers always went on horseback, and their samples were carried in bags, whence these necessary adjuncts of trade were called bagmen.

When comparatively lightly loaded vehicles, *i.e.*, those for passenger traffic, experienced a difficulty in making their way along such roads as existed, what must have been the obstacles in the way of the transport of heavy goods ? In actual practice it was found impossible to employ carts except in or near towns. Corn, wool, and even coal, were loaded into pannier baskets slung across the backs of horses or donkeys. The cost and tediousness of this method set a very practical limit to exchange. It is said to have cost £7 to transport a ton of goods from Birmingham to London less than two centuries ago. Business men, seeing how foreign manufacturers were able to get their goods to the English markets expeditiously and cheaply, thanks to the water routes, began to turn their attention to the improvement of rivers, and the linking up of river with river by means of canals. But the commercial men being a small minority, their schemes had to wait for a national awakening. That the

Transport of Heavy Goods.

Turnpike System. state of the roads was occupying public attention is shown by the adoption of the turnpike system. The first Turnpike Act had been passed as early as the year 1663, but improvements worked slowly. It was not until the winter

of 1745, when the Government was nearly overthrown, mainly because of the bad state of communication between various parts of the country, that England really woke up. The work progressed with a hurry, that may be described as almost feverish, for no less than 452 separate Turnpike Acts were passed by Parliament during the fourteen years between 1760 and 1774. Such an amount of legislation on behalf of communication is only paralleled by the stress of work in Parliament during the early days of railways. These roads, however, useful as they might be for military, mail, and passenger purposes, were of but small advantage for the conveyance of goods, in the quantities that were being demanded by a rapidly increasing trade.

So far as speed in travelling was concerned, improvements began to take place. In the year 1754, Manchester, then almost cut off from civilisation, produced a flying coach, and inaugurated an improved service with London. As

Flying Coach.

announced, this flying coach would, "although the statement may appear incredible, arrive in London (barring accidents) in four and a half days after leaving Manchester." In the year 1784 Palmer's mail coaches began to run, and the journey from Edinburgh to London was reduced to two days and three nights. The speed was thought to be excessive, and travellers were seriously warned of the ill effects likely to result from rushing through the air at such a speed for two or three consecutive days.

Arthur Young, in his *Tours*,¹ gives glowing accounts of the roads and their defects. In one place he mentions being more than ordinarily impressed by the bumping caused by ruts, and on getting down to measure the cause of the discomfort, actually found one rut having a depth of no less than four feet.

There was a deep-lying and unsuspected cause for the unsatisfactory state that continued to be the characteristic of English roads.

The Romans had been great road engineers, but when they left the country, no one took up their rôle in this respect. The roads were bad, not only for

Reason for Poor State of Roads.

want of funds to construct and repair them, or for the wish to have them (indeed, as commerce progressed, there were both the funds and the wish in evidence), but the real obstacle in the way of

¹ *Six Weeks' Tour Through the Southern Counties, A Six Months' Tour Through the North of England.*

obtaining good roads was that even when Parliament provided a way, the carrying out of the scheme was left in unskilful hands. What was required was the scientific training of real road engineers, men capable of constructing roads as good as those whose remains were a monument alike to their constructors and the period of Roman domination. Such engineers as existed considered road construction beneath their dignity, not realising that a good road goes very near towards immortalising its constructor. This state of affairs continued until John Metcalfe (1717-1810) appeared upon the scene ; the first great road engineer in England, for many centuries. Curiously, too, Metcalfe was blind. Yet this blind man was a genius, and in following his instinct, was a considerable factor in revolutionising road-making in this country.¹

When once Metcalfe had shown the way others followed. Macadam (1756-1836) and Telford (1757-1834) continued his great work of putting the highroads of England in good order.

Thus new routes were planned and constructed, and many places hitherto isolated from each other were linked up and became important points on the system of communication. The coach, too, was improved, and so with good roads and a good vehicle a service remarkable alike for its regularity and speed, was organised throughout the country. At its best, however, coach travelling was but slow, and it only met the requirements of passengers and mails. Had roads been the last word in improved methods of communication, the trade of the world would not have developed very greatly. To the transport of goods by wagon on an ordinary road there is an economic limit, which is very soon reached. For instance, it has been calculated that to transport wheat 2,000 miles in a wagon by road would cost 21s. a bushel. Compare with this what has been achieved by modern facilities, namely, that wheat can be carried a similar distance by rail at a cost of 1s. 1½d. a bushel. And this brings it about that wheat, carried long distances, has been sold in New York at 3s. 4d. a bushel. The harvests of the Far West of America would never have reached either the Eastern States or the European markets, had the transport eastward depended on horse-drawn wagons, though the roads might have been never so good.

New Roads Planned.

¹ For a short sketch of Metcalfe's remarkable career cf. Smiles's *Lives of the Engineers*, vol. iii, pp. 74-93.

CHAPTER IV

THE BEGINNING OF THE ENGLISH CANAL SYSTEM

THE great inventions of the middle of the eighteenth century caused the upheaval in manufactures and commerce known as the Industrial Revolution. It is true that this was a peaceful revolution, but it caused so radical a change in the conditions of industrial life in all its spheres that some new means of transport had to be devised, or the new possibilities that were opening out before the manufacturer and trader would to a great extent have been rendered nugatory.

The Industrial Revolution.

It was at this moment that James Brindley and the Duke of Bridgewater introduced into Lancashire a development of water transport by constructing inland canals, which exactly met the needs of the time, and contributed in no small measure to make England the workshop of the world. Canal construction became almost a mania. Between the years 1760 and 1830, practically the whole of the extensive system of canals this country has enjoyed, with the exception of the Manchester Ship Canal and a few short lengths of ordinary barge canal, was constructed.

Water Transport.

When Brindley qualified himself as a canal engineer, canals were no new invention. In the far-off days of antiquity, canals along levels had been dug. A small canal had been constructed across the Isthmus of Suez many centuries before Ferdinand de Lesseps projected his great ship canal.

A Suez Canal before Lesseps.

The advantages of an inland water route, as has already been seen, had been recognised from a very early date, and even when the rail had very considerably diminished the friction of the road, with slow-going traffic, the water road offered less resistance than the land road. "It is estimated that on a good wagon road a single horse-power will drag about 3,000 lbs. at the rate of 3 ft. per second; on a railway about 30,000 at the same rate; in water up to as much as 200,000 lbs."¹

Advantages of Water Routes.

¹ Cf. Chisholm's *Commercial Geography*, 4th edition, p. xxxix.

But when the locomotive gave great additional speed to rail-borne traffic, the railroad became manifestly superior to the canal ; for extra speed on a canal is not only difficult to obtain but is likely to cause serious damage to banks and locks.

To cut a canal along a stretch of level country presented no great difficulty. An adequate labour force and the ability to construct a bottom that would not leak abnormally were the chief requisites. Unfortunately, outside low-lying countries like Holland, there are only a few parts of the world where a canal can be cut along the level. It being impossible to make water run up a gradient, it was not until the lock system was invented that canals could be constructed in undulating or hilly countries. In England there had been, at any rate, two canals constructed during the Roman occupation, and one of these is still utilised. But both these were constructed through the low-lying parts of East Anglia. The *Caer Dyke* (40 miles long) and the *Fosse Dyke* (11 miles long) are both in Lincolnshire—the latter is still navigable.

The Italians and the Dutch dispute as to the credit for the invention of the canal lock. It may have been invented in Italy, where canals were introduced during the twelfth century, but there is no means of deciding the question. Holland has probably benefited by canals more than any other country. The great fact is that the lock was invented, and from that moment inland navigation throughout a hilly country like England became a possibility.

Brindley cannot claim the credit of being the first modern canal engineer in this country, although he was undoubtedly one of the greatest. The first modern canal with various levels to which barges passed through locks, was the *Aire and Calder Navigation* in Yorkshire. This, the first of our modern canals, has kept up its reputation by being equipped in the most up-to-date fashion at the present moment. This canal was opened before the dawn of the eighteenth century, full half a century before Brindley's activities commenced. But it was Brindley's work that led to important results affecting manufacturing England. Thus a short sketch of his work, and what inspired it, will make clear the origin and effect of the movement as a whole in this country.

So far as the Duke of Bridgewater is concerned, he had been watching the new possibilities connected with the lock canal, and having coal-bearing property in the vicinity of Manchester, then a town capable of developing manufactures if it could procure a good supply of cheap coal, he naturally began planning how to effect the latter by constructing a canal from his Worsley mines to Manchester.

**Duke of
Bridgewater.**

Brindley had commenced his working life as a wheelwright. He had been interested in experimenting with steam, but about the year 1755 inland navigation claimed his attention.

**Early Days of
Brindley.**

Earl Gower wished to bring Liverpool and Hull into communication by means of a Trent and Mersey canal, and Brindley was employed to survey the route. During this period the Duke of Bridgewater met him, and decided that Brindley was the man he required to plan and to execute his scheme at Manchester.

Brindley quickly set to work, and the Duke was able to present his first canal bill to Parliament in the year 1759. In the bill the

**The Bridgewater
Canal.**

Duke bound himself to carry coal to Manchester at a maximum charge of 2s. 6d. a ton, and to sell coal at Manchester at a price not exceeding 4d. for a hundredweight ; about half the price then charged for coal in Manchester. Parliament consented to the scheme and, with some modifications, it was carried through. The scheme included what for the time was a great engineering feat, the bridging of the river Irwell at Barton. The aqueduct there was 200 yards long and 12 yards wide, and carried the canal over the river at a height of 39 ft. From the mines at Worsley to Manchester is $10\frac{1}{4}$ miles. At Worsley it was necessary to construct a head of navigation, *i.e.*, water space for barges to collect. At this point Brindley's genius effected a further economy in working. The coal measure was in the side of a hill. If the coal were hoisted to the surface, it would then have had to be lowered from the hillside into the barges. Brindley saved this double handling by tunnelling into the side of the hill, and so taking the barges to the coal. The first barge load of coal passed along the canal on the 17th July, 1761. The Act of Parliament permitting the construction had only been passed in the session of 1760, so that the work was not only successful, but had been very expeditiously carried out. The immediate result was that

Manchester secured a regular and sufficient supply of coal at a price which on the average was 50 per cent. cheaper than the previous intermittent supply. The ultimate effects of Brindley's work can be realised by remembering that as a necessary complement to the Worsley Canal, Brindley and the Duke constructed another canal connecting Manchester with the Mersey, and thus giving continuous water transport between the manufacturing town and its natural seaport ; and then by comparing the Manchester and Liverpool of the middle of the eighteenth century with the Manchester and Liverpool of to-day. For not only had Manchester suffered from the lack of a cheap and sufficient coal supply, but the difficulties connected with getting raw materials from Liverpool, and transporting manufactured goods to the port for shipment, had they not been overcome, would have very considerably reduced the advantages gained by the construction of the canal which provided Manchester with cheaper fuel. The land road between Liverpool and Manchester at the middle of the eighteenth century did not deserve the name of a road. Its condition was so bad that it cost £2 a ton to transport goods along the forty miles. There was a water route of a kind—for the river Irwell connected Manchester with the Mersey—but the Irwell navigation was subject to both floods and droughts, and at times was not available. Hence, although the cost of transport by this route was only about 12s. 6d. a ton, it was of too uncertain a character to meet the requirements of a developing commerce. It would, nevertheless, be an exaggeration to attribute the whole of the progress made to the two local canals, but undoubtedly it was the impetus then given that revealed commercial and industrial potentialities hitherto beyond the realm of dreams.

For many years after the opening and success of the Bridgewater Canal the construction of artificial waterways was carried on with great vigour.¹ The commercial energy and engineering talent which was afterwards to go to the construction of railways threw itself into this line of operation. A writer whose work was published in the year 1795 says—

“The prodigious additions made within a few years to the system of inland navigation, now extended to almost every corner of the kingdom, cannot but impress the mind with magnificent ideas of the opulence, the spirit, and the enlarged views which characterise the commercial interest of this country. Nothing seems too bold for it to

¹ Cf. *Final Report of the Royal Commission on Canals*, 1909, p. 3.

undertake, too difficult for it to achieve, and should no external change produce a durable check to national prosperity its future progress is beyond the reach of calculation.”¹

The same writer points out that—

“At the beginning of this (eighteenth) century it was thought a most arduous task to make a high road practicable for carriages over the hills and moors which separate Yorkshire from Lancashire, and now they are pierced through by three navigable canals.”²

It is not necessary to detail all the canals constructed; suffice it to say that the Mersey, Thames, Severn, and Trent were all joined, and a network of canals was constructed in Birmingham and the South Staffordshire Black country. The following is a list of Brindley’s canals taken from Smiles’s *Lives of the Engineers*—

		M.	F.	Ch.
The Duke’s Canals {	Worsley to Manchester .	10	2	0
	Longford Bridge to Runcorn .	24	1	7
Grand Trunk (Wilden Ferry to Preston Brook) .		88	7	9
Wolverhampton Canal		46	4	0
Coventry Canal		36	7	8
Birmingham Canal		24	2	0
Droitwich Canal		5	4	9
Oxford Canal		82	7	3
Chesterfield Canal		46	0	0

This list, of course, falls far short of exhausting the number of canals constructed. England became covered with a system of artificial waterways, which (though defective through lack of uniformity, as will be seen from the chapters dealing with canal economics) were immensely beneficial to the community. They gave to commerce easy means of transport in place of execrably bad roads, and thus not only cheapened the cost of transport but widened its area and stimulated it beyond the possibility of accurate estimate at this distance of time. And this occurred at the period of what has been aptly termed “the Industrial Revolution”; when James Watt had invented the steam-engine, and many other mechanical inventions were changing the character of the industries of the country—were

converting them from small scale domestic industries to relatively large scale factory industries. All this was not done at once, of course. It was a gradual, evolutionary process; but the part which canals played in facilitating the revolution cannot be overestimated.

¹ Aiken’s *Lancashire*.

² Aiken’s *Lancashire*, p. 137.

Some idea of the reduction brought about in the cost of transport may be obtained from the following figures¹—

		COST OF GOODS TRANSPORT PER TON.					
		By Road.			By Water.		
Between		£	s.	d.	£	s.	d.
Liverpool and	Etruria	2	10	0	13	4	
"	" Wolverhampton	5	0	0	1	5	0
"	" Birmingham	5	0	0	1	5	0
Manchester,,	Wolverhampton	4	13	4	1	5	0
"	" Birmingham	4	0	0	1	10	0
"	" Lichfield	4	0	0	1	0	0
"	" Derby	3	0	0	1	10	0
"	" Nottingham	4	0	0	2	0	0
"	" Leicester	6	0	0	1	10	0
"	" Gainsborough	3	10	0	1	10	0
"	" Newark	5	6	8	2	0	0

In their book, *Our Waterways*, Forbes and Ashford state—

"Up to the close of the year 1838–39 there had, according to a calculation made by Rennie, been formed in Great Britain 2,236 miles of improved river navigation at a cost of £6,269,000, and 2,477 miles of canals at a cost of £24,406,389."

Naturally the canals were prosperous. The fourth and final Report of the last Royal Commission on Canals and Inland Navigation quotes from the *Gentleman's Magazine* for December, 1824, the following table of dividends paid on, and prices of, canal shares.

Canal.	Dividends.			Price of Shares.
	£	s.	d.	£
Trent and Mersey	75	0	0	2,200
Loughborough	197	0	0	4,600
Coventry	44	0	0	1,300
Oxford	32	0	0	850
Grand Junction	10	0	0	290
Swansea	11	0	0	250
Staffordshire and Worcestershire	40	0	0	960
Birmingham	12	10	0	350
Worcester and Birmingham	1	10	0	56
Shropshire	8	0	0	175
Rochdale	4	0	0	140
Lancaster	1	0	0	45
Kennet and Avon	1	0	0	29
Leeds and Liverpool	15	0	0	600

There are wide variations in the dividends and prices, and the inference is that some of the canals were not very profitable, but these appear to have been few in number, and the majority enjoyed great prosperity which was reflected in both dividends and prices.

Prior to this there had been the inevitable "mania" which

¹ Reproduced in E. A. Pratt's *History of Inland Transport and Communication in England*, from Barnes's *History of Liverpool*.

seems to be inseparably associated with every commercial development into which the public are allowed to come as shareholders.

**Canal
Speculation.**

It occurred in the "South Sea Bubble," it occurred in connection with canals, it occurred in connection with railways, and many years later it occurred in connection with cycle companies, for instance. The canal mania occurred between 1791 and 1794, and it gave rise to a great deal of unwise speculation in the shares of the existing companies and to the flotation of projects which never had the semblance of a hope of success. Much money was lost ; many investors were ruined ; but that was the fault of the individuals : it in no way detracted from the importance or the usefulness of the service to the community which canals were performing and continued to perform for many years.

Canals prospered and became finally characterised by all the abuses inseparable from prosperous monopolies. Prosperity brought stereotyped rigidity and petrefaction. The owning

**The Monopoly
of Canals.**

companies were finally more concerned to maintain and increase their own profits than to meet the growing requirements of commerce, and from that period (the early part of the nineteenth century) dates their downfall. The coming of the railway in the thirties of the nineteenth century marks the end of the canal era. Some of them continued for a long time after to retain a large share of the transport industry of the country ; some of them in this twentieth century still continue to carry large volumes of traffic ; but in the main, inland navigations are barely profitable or absolutely unprofitable undertakings. Those which remain profitable are the canals whose management has continued enterprising and progressive, and has not hesitated to face the expenditure necessary to bring them up to date and keep them efficient. There have been one or two inland navigations, such as the Manchester Ship Canal, constructed during the second half of the nineteenth century, but for every mile of new canal there have been many miles that have either been allowed to become derelict, or have not been improved and maintained in that condition of efficiency necessary to meet the modern requirements of commerce. Their present defective condition, the reasons for it and the proposed remedies are subjects discussed in the chapters dealing with canal economics.

CHAPTER V

RAILROADS AND THE LOCOMOTIVE

It was the desire to find a market for coal at Manchester that induced the Duke of Bridgewater to plan out his canals with Brindley.

Advent of the Railway.

It was the difficulty of dragging coal from the pit's mouth over bad roads to river or canal that led to the evolution of the railroad, and it was the great cost of horse feed during the last years of the eighteenth and the opening years of the nineteenth century, that led to the invention of the locomotive engine. This one commodity, *coal*, has been the mainspring in the working of our national industries and commerce. One advisedly mentions both industry and commerce, for, as will be seen in a later section of this book, when steam power was successfully applied to ocean voyaging, it was the transport of English coal to coaling stations on the main ocean routes that gave British shipping an advantage which has lasted down to the present moment, and is only now being disputed by foreign rivals mainly because of the introduction of new forms of power and fuels other than coal.

Good as the ordinary roads had become during the last half of the eighteenth century, they were not intended for heavy traffic.

Coal Cartage.

Even though the coal-tracks had been macadamised, it is doubtful whether they would have met the requirements of the traffic. Moreover, such roads were expensive to construct, but for public traffic a good common road was a necessity. Where wagons were employed in carting coal from the pit's mouth to the barge or keel and had to return empty, all that was required was two tracks sufficient for the purpose of an up and down service. The slow and expensive method of slinging sacks or baskets of coal across a horse's back had been superseded by the two-wheeled cart, and this cart had, in some parts, given place to the four-wheeled wagon. But with increasing loads, the wear on the colliery tracks was found to add greatly to the friction, and hence to the cost of haulage. A double stone track, of a gauge to suit the distance between the wheels of the vehicles was

found to lessen friction very considerably and so reduce the cost of cartage. Colliery proprietors adopted this method of road-making, and at various collieries, long roads were constructed, with either stone or timber tramways laid on them. Arthur Young came across coal tracks constructed in this way, some of which were about 10 miles long, and he was interested in finding to what an extent they lessened the work of a horse, one animal being able to drag as much as 60 bushels of coal in a cart along a road of this description. This was really the germ of the railway track. Stone tracks were expensive to lay and keep in repair; wooden tracks soon rotted or splintered. To prevent the latter, some enterprising colliery manager sheathed the timber with iron plates. These plates effected a further considerable saving of friction and increased the capacity of a horse, but the wood under the iron still rotted. This led to a trial of cast-iron rails. At a colliery near Sheffield there was a cast-iron track fixed to wooden sleepers as early as the year 1776. But as the loads of coal increased, the cast-iron rail was found to be too brittle, hence the introduction of the wrought-iron rail, the immediate progenitor of the steel rail now in use. In connection with colliery work, then, railroads capable of dealing with a maximum of weight at a minimum of effort were gradually perfected.

THE LOCOMOTIVE

For many decades before James Watt's successful experiments, the possibilities of steam had attracted the attention of inventors, and no

The Locomotive. sooner had Watt shown how to utilise the force of steam by the invention of the stationary engine than, with renewed vigour, attempts were made to produce a self-propelled steam vehicle. At the South Kensington Museum there is to be seen a model of a steam carriage, which was tried in the streets of Paris as early as the year 1770. This engine had been invented by Cugnot in the year 1763. His object was to produce a steam carriage capable of transporting guns and military stores. The form the engine takes is a wooden framework supported on three wheels, the central wheel being acted upon by the piston rods of two cylinders. The boiler which supplied the steam to the cylinders was small; indeed in practice it was found to be too small to keep a sufficient head of steam to make the engine

a success. The difficulty in keeping the necessary pressure of steam resulted in the average speed of the carriage amounting to about only $2\frac{1}{2}$ miles an hour. When tried in Paris this engine overturned when negotiating a corner and was condemned as dangerous.

In both America and in Great Britain several unsuccessful attempts at producing a steam locomotive were made during the last quarter of the eighteenth century. The attempt which **The Advance of the Locomotive.** most nearly succeeded was a model engine constructed by William Murdoch in Cornwall. This was in the year 1786. The machine ran well, but it was only a small model, and apparently Murdoch did not attempt to construct a full-sized engine for practical work. But his invention was not lost, for his pupil, Trevethick, constructed the first steam carriage to run in England. This carriage would travel well enough for a very short distance; the difficulty that all the early engineers failed to overcome was the impossibility of keeping up the steam pressure necessary for continuous travelling. Trevethick attempted to create sufficient draught by using bellows, but his engine, though a great improvement on Cugnot's, was a failure owing to its intermittent working powers. But that Trevethick did not despair of finding a solution to this difficulty is proved by the fact that he described his engines as being capable of running either on ordinary roads or on rails. He very nearly happened upon the forced draught, which was George Stephenson's great contribution to the perfecting of the locomotive engine. For the exhaust steam from his steam carriages created a nuisance, and he attempted to prevent this by leading the exhaust pipe into the funnel. The engine which contained this innovation was employed in a colliery in South Wales and was able to draw 10 ton loads at a speed of 5 miles an hour. But the weight of the engine and load was too much for the *permanent* way, and the locomotive was converted into a stationary engine.

The experiments, becoming more and more successful, gradually made their way northward. The next interesting attempts were

Experiments. made at Leeds. There were other difficulties to be overcome besides those of keeping up steam and increasing the solidity of the roadway. None of the early engineers could get away from the belief that a smooth wheel would not grip a smooth rail, and that thus, if locomotives were

run on rails instead of on roads there must be specially constructed gearing in order to make the wheels grip the rails. Hence, up to the year 1814, the wheels of locomotives were toothed and worked in a toothed rail. At Leeds, Blenkinsop produced a rack-rail which connected with gearing on the engine. In constructing an engine to work on this principle, Blenkinsop adopted another Leeds invention, the double cylinder. An engine thus constructed worked fairly successfully at the Middleton Collieries, the speed averaging about 4 miles an hour. This experiment may be said to be the first successful application of the steam locomotive to commercial transport purposes. Several attempts were made to simplify the gearing between the rail and the engine, and finally, in the year 1814, Matthew Hedley demonstrated the fact that a smooth wheel not only can but will grip on a smooth rail. This very considerably cleared the air, and led to a series of experiments at the colliery at Wylam, near the Tyne. This colliery is four miles from the river. There was a track laid with timber, which ran from the pit's mouth to the keels lying in the Tyne ready to receive the coal. The coal was carried in carts containing about 25 cwt. each, and as a cart drawn by one horse could only make five single journeys in a day, the cost of cartage was very heavy. Borrowing Trevethick's drawings, Mr. Blackett of Wylam constructed a series of engines. The difficulties of the engineer were greatly increased by the fact that workmen, tools, and materials were by no means easy to obtain. Wheelwrights and blacksmiths had to be developed into fitters, and tools had to be contrived to meet the needs of each new operation. But it must have been the lack of suitable materials for constructing an engine that caused the main difficulty. Rolled wrought-iron plates suitable for boiler construction had been available since 1786, but the early locomotive builders obstinately pinned their faith to cast-iron boilers. And these boilers frequently burst, doing more or less damage to life and property. At length Blackett constructed a locomotive with a wrought-iron boiler, and, although a clumsy-looking piece of machinery, it was capable for the work required, and worked regularly. The success of the locomotive engine was at hand. George Stephenson was engineer at Killingworth Colliery, and went over to Wylam to inspect the new engine. As a result of what he saw, he persuaded Lord Ravensworth to allow him to construct

a locomotive for the Killingworth Colliery. It took the greater part of a year to complete the engine ; however, by the middle of the year 1814 it was ready for trial and succeeded in dragging a load of 30 tons up a slight gradient at a speed of about four miles an hour. But would such traction be more economical than horses ? For twelve months strict accounts were kept, with the result that it was proved that the locomotive and horses worked at the same cost—there was at present no economic advantage in employing the engine. But while the engine was at work Stephenson was watching it, confident that if he could overcome the difficulty in keeping up a sufficient head of steam, the speed and capacity of a locomotive would only be limited by the strength of the materials employed in its construction. Noticing that the exhaust steam left the exhaust pipe at a greater speed than did the smoke from the funnel, it occurred to Stephenson that increased draught might be produced by leading the exhaust into the furnace. This idea was acted upon and success was the result. Forced draught was invented. George Stephenson had perfected the locomotive. Since his day many have been the modifications made in the railway engine, but Stephenson's locomotive,¹ fitted with forced draught, in the year 1815, contained all the essentials of the twentieth century engine.

It is a remarkable fact that although Stephenson had succeeded where so many had failed, and the engines at Killingworth worked steadily and economically, it was some years before the outside world realised what had been achieved.

It was the construction of the Stockton and Darlington railway that made Stephenson's genius known to the world. While Stephenson was quietly perfecting the locomotive at Killingworth, Mr. Edward Pease was endeavouring to improve the means of transport so that the southern end of the Durham coalfield might be developed.

**Stockton and
Darlington
Railway.**

To this end some means must be devised for conveying coal cheaply from the collieries to Stockton-on-Tees for shipment. There were rival schemes before the public for accomplishing this. One party wished to improve the channel of the river Tees, and to give communication by water, but Edward Pease was convinced of the

¹ Either models or originals of these pioneer locomotives can be seen in the South Kensington Museum, London.

superiority of a railroad and refused to compromise. This led to the formation of the Stockton and Darlington Railway Company, Mr. Pease having succeeded in obtaining parliamentary sanction for his scheme in April, 1821.

George Stephenson soon heard of the Stockton and Darlington railway scheme, and determined to make himself and his locomotive known to the projector. In an interview he

**Stephenson and
Pease.**

so interested Mr. Pease in the work his engines were doing at Killingworth Colliery that the latter visited Killingworth to see for himself the superiority of steam over horse traction. At first Mr. Pease does not appear to have been convinced that the locomotive would prove efficient on his railway, but he was so strongly impressed by Stephenson's personality and grasp of the technicalities of transport business, that he persuaded his fellow directors to appoint Stephenson engineer to the new company, with the privilege of carrying on independently an engineering works for the construction of locomotives. The directors, too, were persuaded to try the effect of steam traction on the new railway. This had not been contemplated when the Act was obtained, so Parliament was applied to again, and in August, 1823, the first Act of Parliament authorising the employment of locomotives for passenger traffic was passed. In the following year, 1824, the Stephenson works at Newcastle-on-Tyne were founded. The railway company placed an order for three locomotive engines with the Stephenson firm. As goods traffic was expected to be the main business of the line, the type of engine decided upon was suitable rather for heavy goods than passenger traffic. It weighed about 8 tons, and had an average speed of about 15 miles an hour.

The work of constructing the permanent way and getting ready the necessary equipment was actively carried through, and on the

The First Journey.

27th of September, 1825, the railway was publicly opened. The first train to travel from Darlington to Stockton consisted of an engine with thirty-four vehicles attached. Next to the engine there were six trucks, loaded with coal and flour, then a passenger coach (specially constructed for the service by Stephenson) containing the directors of the company; following this were twenty-one trucks in which, for this journey, seats had been placed so that between 500 and 600 people could enjoy the first orthodox railway journey ever made: the train was

completed with six more trucks loaded with coal. The run was carried through with complete success, and the speed for the whole journey averaged 12 miles an hour. That about 600 people, together with twelve loaded trucks, could be safely and expeditiously transported at this speed proved to the world at large that Stephenson had indeed succeeded in producing a locomotive engine capable of rendering a service to mankind the benefits of which time alone could measure. Methods of transport, it is true, had been revolutionised by the modernising of the canal, but the invention of the steam locomotive closed one epoch and opened another. The age of steam, which commenced with Watt's invention of the stationary engine, attained a fresh significance and opened up new possibilities when George Stephenson ran his train from Darlington to Stockton on that memorable day in September, 1825.

PART I

THE RAILWAY IN THE UNITED KINGDOM AND ABROAD

CHAPTER I

A STANDARD GAUGE

WHEN George Stephenson demonstrated so successfully the merits of his locomotive, there were already a good many miles of *railroad* existing in this country. The advantages connected with the rail had been discovered at our collieries, and from assisting in the transport of heavy commodities like coal, the rail had been adopted, with some success, for passenger and other services. As early as the year 1799, there was a scheme for connecting London to Portsmouth by a railroad. One outcome of this was the construction of the railway from Wandsworth to Croydon, across Mitcham Common. Horse traction was employed and the weight that could be drawn by one horse along iron rails was a great surprise to Londoners. A number of Acts were passed by Parliament during the following twenty years, permitting the construction of railroads. It was not, however, till 1823 that an Act of Parliament sanctioned the construction of a railway on which steam locomotives were to be utilised. Most of the early railroads were absorbed in the railway systems which, with the success of the Stockton and Darlington Company, began to spring up all over the country. From 1825 to 1846 may be looked upon as the period of railway construction. The big company with a capital amounting to many millions of pounds would have been an anomaly early in the nineteenth century. Thus the first railway companies were comparatively small affairs. But when once the question of gauge had been settled by the Act of 1846, the period of consolidation of systems began—and these consolidations might, perhaps, with benefit, have been carried farther than they were, had not Parliament decided that amalgamations of continuous lines might

be safely allowed, but that an amalgamation of competing lines would be contrary to the interests of the community.

The Stockton and Darlington Railway taught railway managers many useful lessons ; the two most important of these to railway practice and economics are well worth a little consideration.

A speed of 12 to 15 miles an hour was greater than a horse could maintain. But at first the intention was that a railway should be worked on the same lines as a canal, owners of vehicles being charged a toll for the privilege of using an improved road. No sooner, however, did the railways begin to function than it became evident that when vehicles ran on rails, the slowest vehicle set the pace to all those behind it. The Stockton and Darlington Railway had frequent sidings to meet this difficulty, but experience of the working of the line showed that a railway company was something quite distinct from either a turnpike authority or a canal company ; and that to get the best results from both the rail and the locomotive, the management must not only own, control, and maintain the permanent way, but must have complete control over all the services functioning along the line. In other words, a railway company must not only own a road, but also be a common carrier, and have responsibility for both the goods and passenger trains running on its system. This in itself brought about a great and indeed a very revolutionary change in the conception of how the transport of either goods or passengers should be conducted. It was evident, therefore, almost from the outset of railway enterprise, that the new method in transport would require many changes in the customs and methods of the travelling and trading public ; and that new laws and regulations must be framed to meet this changed state of affairs.

The second great lesson taught to railway management by the first railway was that regular transport of large quantities of any commodity can be carried on at a very small rate, and yet be paying business. In other words, if you have regular traffic, which gives a through haul, full truck-loads, and but little handling, you get a maximum of economy at a minimum of expense. Thus railways, almost at the outset, showed their capability for dealing with large quantities of dead-weight, if the business was regular, at very low rates.

**Revolutionary
Nature of Change
in Mode of
Transport.**

**Volume and
Economy.**

The proprietors of the Stockton and Darlington Railway had expected to make their chief profit from the transport of coal. Their hopes that they would build up a great business in the shipment of coal from Stockton to London had, however, been considerably damped by an amendment which had been moved by Mr. Lambton, the member for Sunderland, when the Bill was before the House. This amendment had been carefully framed in the interests of Mr. Lambton's constituents, whose coal, to a great extent, supplied the London market at that time; and was to the effect that for the hauling of coal to Stockton-on-Tees, the maximum rate should be $\frac{1}{2}$ d. per ton per mile. This amendment was carried, although the company was allowed to charge a maximum of 4d. per ton per mile on coal carried along the line for local sale. Mr. Lambton and his friends had confidently expected that the $\frac{1}{2}$ d. rate would very effectually prevent any coal from passing along the line for shipment at Stockton. To the surprise of everybody, it was this traffic that in practice was found to be the dividend-earning business of the company, and ere long the quantity of coal carried for shipment each year averaged no less than 500,000 tons.

The desire for railway extension, when the first short services had shown their capabilities, is not to be wondered at. The turnpike

Railway Extension.

roads had proved to be inefficient for the transport of goods, and canals had been constructed in various parts of the country specially to assist the industrial towns.

But canals, although a great improvement on previous methods of transport, were found to be too uncertain under the conditions existing in some parts of the country. The canals themselves were efficient enough, but where the canal entered a river, the condition of the river governed the canal so far as through traffic was concerned. It was the uncertainty of getting the goods along the Tees that had caused Mr. Pease to plan the Stockton and Darlington railway. It was in much the same way the uncertainty of navigation on the upper waters of the river Thames that led to the formation of the Great Western Railway Company, which was originally to have been called the Bristol and London Railway Company. The transport of goods between London and Bristol had been by way of the Thames to Reading, then by canal to Bath, where the barges entered the Avon, and proceeded to Bristol. When times were normal all might be well, but times were

not always normal. Floods and droughts come and make a river an uncertain means of communication, unless that river be conserved for purposes of navigation. As a result, although the canals were safe and sure, goods and barges were frequently delayed in the Thames or the Avon. Delays of from three to six weeks might occur. Such irregularity of service was not calculated to help business. Hence a proposal was made about the year 1824 to lay a railroad from London to Reading and from Bath to Bristol. Goods would thus travel by truck from London to the canal, they would there be transferred from the truck to the barge, and on reaching Bath would require re-handling to transfer them to the truck for Bristol. This handling meant an added expense, but that was trifling compared to the annoyance and inconvenience so frequently caused by long delays on the river sections of the old route. To save the extra handling a proposal was made to construct a through railroad from London to Bristol. This, however, would have meant competition with the existing canal, and there were discussions as to the merits of the two schemes which deferred matters for a few years. Then the success of the Liverpool and Birmingham, and the Stockton and Darlington railways showed that further discussion was unnecessary ; the obvious necessity was a railway served by steam traction to connect the great commercial centres of the east and west. Hence, in the year 1832, what was destined to become the Great Western Railway took shape, and the following year Brunel was appointed engineer to the company.

This period in railway history is most interesting, probably the most interesting of any part of the story : for the Stephensons were making themselves a power in the north, and now their great rival was to begin the system on which his broad gauge was to be adopted. The adoption of the 7 ft. gauge by the Great Western Company raised the question of the advisability of adopting a standard gauge for the whole country. Apparently, George Stephenson was the only *statesman* among railway engineers or proprietors. He was able to take broad views, and, looking well ahead, could foresee the ultimate extension of the railway over the whole country, and hence the necessity for keeping to one gauge for the track, in order that the rolling stock of all systems might function along any rails, wherever they might be laid. It was thus that, when Joseph Locke asked Stephenson

**Brunel and the
Stephensons.**

what gauge the railway he was constructing between Canterbury and Whitstable should be, the answer he received was, "Make it 4 ft.

**The Fight of
the Gauges.**

8½ in., for though they be a long way apart now, depend upon it, they will be joined together some day." This was a broad statesmanlike view, al-

though different from that which influenced Brunel and his directors to lay the broad gauge for the Great Western system. Brunel undoubtedly believed in the superiority of the broad over the narrow gauge, but he also, and his directors too, hoped that by adopting the 7 ft. gauge they would be able to maintain a monopoly over the west and south-west of England. Looking back now, one is apt to wonder why the projectors of each short length of railway hesitated as to the gauge, but as things were then, it required a man of Stephenson's faith in railways to foresee a network embracing every section of the country. And yet is not the same error being committed by the municipal authorities to-day? At no far-off date the tramway systems of this country may link up first of all neighbouring towns, and, by that means, eventually large areas, or even the whole country, may be made parts of one system; and yet there is no standard gauge. Some authorities for economy's sake have installed narrow gauge trams, others have more wisely adopted a broader system, yet both must eventually come into contact, indeed, in some cases, already do meet, necessitating a change of car for those passengers who need to travel beyond the break of gauge. But the justification for the policy is that trams are for passengers only; there is no need for expensive re-handling of goods. This, however, is rather an excuse than a justification—a uniform gauge would make for speed, convenience, and possibly for safety.

The position in the early thirties did not become pressing, but as the mileage of track increased, the work of construction became a big thing, and there was no longer any doubt that the whole country was to be covered with lines. Stephenson's contention came home to the minds of all thinking people, and it was determined to get Parliament to decide on a standard gauge for the whole country.

**Necessity of
Standard Gauge.**

A gauge of 4 ft. 8½ in. looks somewhat unscientific. Why should it not have been 5 ft. or 4 ft. 6 in.? Stephenson, in constructing the Stockton and Darlington Railway, had adopted the colliery gauge. The coal carts, probably from

Which Gauge?

time immemorial, had been constructed to that gauge; at any rate when tracks were laid and then rails took the place of timber, the gauge adopted was 4 ft. 8½ in. to fit the carts. The gauge of the carts had probably been fixed by rule of thumb at the width at which it was most economical to cut the timber for their construction. However this may be, in the north country collieries, the railroads had this narrow gauge, and the early roads constructed by Stephenson were of the same gauge in order that the rolling stock of both colliery and railway might function along them.

Brunel's broad gauge was an innovation, nor was it easy to find a justification for it. It has been said that Brunel adopted it for safety's sake, that he disliked the carriages and wagons projecting over small wheels, and so constructed a car for the Great Western system of the ordinary dimensions, but supported it on large wheels which projected. The directors of the company apparently disapproved of this coach as being uneconomical, and so ordered another to be built that should have the full width allowable on a 7 ft. gauge, which would enable two additional passengers to travel on each seat. If this be so, Brunel's innovation stood condemned from the beginning.

With Stephenson, business considerations always weighed. To him the narrow gauge was a business proposition, and even though greater speed might be attained on the rival system, the first necessity was for railways to be paying concerns, and thus attract the capital which would be required in such enormous amounts, if his dream was to be fulfilled. The Battle of the Gauges waxed hot, and finally Parliament appointed a Commission to consider the whole question. As a consequence a series of tests was arranged. The broad gauge was tested between Didcot and Paddington, the narrow gauge between York and Darlington. Rival trains with a load of 80 tons showed that Brunel's system could give a speed of 50 miles an hour, Stephenson's but 44. Nevertheless, looking at the question from every standpoint, especially as to capital, earnings, and goods traffic,

Triumph of the Narrow Gauge. it was decided that the advantage lay with the narrow gauge. Parliament, therefore, in the year 1846, passed the Act for Regulating the Gauge of Railways, by which the gauge for England, Scotland, and Wales was fixed at 4 ft. 8½ in.,

and that for Ireland was fixed at 5 ft. 3 in. The Great Western Company for a time persisted in their gauge policy, but eventually had to come into line with the rest of the railways. Finally, in the year 1892, the last of the old broad gauge disappeared, to the great advantage of the Great Western Company.

CHAPTER II

SOME INITIAL DIFFICULTIES

THE year 1846 fixed a standard gauge for English railways, and in doing so, opened the way towards a consolidation of many small railways into one big company. But, as has already been noticed, Parliament discouraged the amalgamation of the big companies. This policy has had both its advantages and its disadvantages.

Before, however, considering how amalgamations were effected between various companies, it is necessary to say something more concerning the early days when railway construction was a possibility, but railways had not as yet proved their capacity to pay dividends to shareholders.

The first railway projectors found their path strewn with difficulties, nor was it a light task to overcome the obstacles that impeded progress at every step. The railway was a new thing ; especially was the idea of making use of a steam locomotive abhorrent to conservative people, who, arguing that as horses had proved themselves capable of satisfying the trading needs of the country during all known time, there was no need to fly in the face of Providence, and displace a noble animal by a machine that might burst and deal death and destruction to all around.

The arguments then used against railways sound puerile indeed, but even to-day, equally silly objections continue to be made when a Parliamentary Committee is considering some scheme to improve means of transport. The canal, the railway, the motor-car, and the aeroplane, each in turn has to endure not only the ignorant criticism of those whose material interests may suffer by its adoption, but of people who are temperamentally opposed to any novelty. It must be admitted, however, that even captious opposition may do some good. It undoubtedly has the effect of causing projectors and inventors to make sure of their ground and produce their very best before

**Natural
Conservative
Instincts.**

**Prejudice against
Railways.**

attempting to get concessions from the community. But at the same time opposition can be carried too far, and become a policy of mere factious delay, or of an attempt to squeeze the greatest pecuniary return possible for a concession. It was so with the early railways, and railway capital has suffered right down to the present from the enormous sums that had to be paid to buy off opposition. A typical instance of this occurred when the London and Birmingham Railway Bill was before Parliament. The first Bill was thrown out by the House of Lords, and yet, when presented the following session, was carried without much difficulty. The explanation of this change of front would appear to be, that, whereas the original estimate of the price to be paid for the land on which the railway was to be constructed was £250,000, the price actually paid was no less than £750,000, or, to put the matter plainly, a bribe of £500,000 was required to beat down the opposition of interested parties. Methods like this did much unnaturally to inflate railway capital, and in this connection it may be noted that the capital of English railways was also increased by the fact that, in this country, most of the experiments for proving the efficacy of railways were tried. Experience generally has to be paid for ; in the case of railways the price of this very necessary experience was high. England paid the bill ; the world at large gained the advantage of this dearly bought knowledge, and other countries were able to plan out their railway systems in the light of ascertained facts. Yet another point as to the difficulty that the early railway projectors experienced in this country in raising capital, and which tended to swell the amount of capital on which dividends had to be paid. At first the investing public were shy, and in order to induce people to invest in railway stock in some cases it was issued, or at any rate was allotted, at a considerable discount ; sometimes this would be as much as 50 per cent. In a later section of this book the whole question of railway capital and the causes of artificial inflation have been treated.

Not the least effect of canals and railways on our national life was that they caused the rise of new centres of industry and the decay of many a historical town. This was not altogether the fault of the new methods of transport, although it can be traced to both canal and railway. In fact, where towns have decayed since the

**Effects of
Railway on
Towns and Trade.**

introduction of modern methods of transport, the fault can generally be traced to the towns themselves. Early canal projectors encountered the most unexpected opposition from towns through, or near, which the proposed canal would run. Carriers and others interested in carting and horses declared that their businesses would be ruined, and that horses would no longer be required. In some cases the opposition was so strong that the proposed line of the canal was altered, so as to pass three or four miles from a given town, in order that goods for that town would have to be carted by road.

The convenience of being on a canal or railroad accounts for the origin and rapid development of many of our northern industrial towns. Business concentrates at convenient centres, and these are where facilities for communication and the transaction of business exist. The district or town that barred out facilities, or kept them at a *safe distance*, has inevitably suffered in that its development and progress have come to a standstill from the moment that it turned its back upon new methods. No lesson comes out more clearly in industrial history than this, that the nation, community or individual that neglects new opportunities and improved methods for carrying on business is soon out of the running and ceases to progress. Civilisation and commerce have invariably advanced hand in hand, and the neglect of the latter has always imperilled the former.

CHAPTER III

THE EVOLUTION OF TRUNK LINES

THE railway, like the canal, soon justified the optimism of its early projectors. Canal companies had paid good dividends, and for a long time were considered perfectly safe investments. Then the railway came. At first it had to prove its capability as a method of transport, and its ability to pay a regular dividend on the capital required for its construction and equipment. No sooner were these ascertained facts than railway stock as an investment began to take the place of that of the canals in the favour of the public. Unfortunately, too, just at this time, circumstances conspired to increase the popularity of railway stock until the investing public lost their heads, and the railway manias of 1836 and 1845 seemed for a time likely to bring the country to the brink of financial disaster.

In spite, however, of speculation and, it must be confessed, the employment, in some cases, of vicious financial methods, very considerable progress was made with genuine railway construction. The proof of this can be grasped by noting the dates of the foundation of some of our leading railway companies. The London and Birmingham Railway, later the London and North Western, dates from the year 1833, but the 2,000 miles of track managed till 1923 from Euston represented the amalgamation of over 100 railway companies; nor was the London and Birmingham Railway the senior of these, although it may be looked upon as the main trunk to which all the others became naturally attached. The London and Southampton, later the London and South Western Railway, dates from the year 1834; the Great Western Railway, 1835; the South Eastern, 1836; the Eastern Counties (from 1862 known as the Great Eastern), 1836; the London, Brighton, and South Coast, 1837; and the Great Northern, 1846.

It is from the last-named year (1846) that order really began to emerge from chaos, for from that date the chief systems of

this country gradually evolved. Parliament, after being congested with railway business to such an extent that a stoppage of the legis-

Parliamentary Procedure Simplified. lative machinery appeared to be highly probable, adopted a definite policy as to concessions, and passed the Railway Clauses Consolidation Act (1845), which by prescribing the form in which

all railway Bills must be presented, limited the attention that need be given by the House to any one Bill, to the details of the scheme for which it had been framed. The policy as to concessions is of interest in that it shows how reckless competition may be prevented, and yet a practical monopoly may be robbed of most of its evil possibilities. Parliament requires proof that a proposed railway is really needed. Where this requirement is fulfilled, there has been little difficulty in getting the necessary Act passed. Thus railway promotion has been remarkably untrammelled by any Government interference in the United Kingdom.

Reference has already been made to the amalgamation of many small companies into one great system. This policy towards combination dates from the early forties. It is one thing

Difficulties of Amalgamations. to declare that the amalgamation of several small companies into one big one will benefit the com-

munity, but quite a different matter to bring such a policy to a successful issue. There are so many conflicting interests which have to be brought into harmony. The small undertakings probably have been organised under very different conditions as to management, capital, and working. In order to effect an amalgamation the services of many officials have to be dispensed with. Only one Board of Directors is necessary for the new and enlarged company; only one staff for office and management work. Hence Directors' fees and officials' salaries are in jeopardy. Even after the interests of officials and shareholders have been considered and necessary points of friction connected with these have been adjusted, Parliament has to be faced, and when the Bill comes before the Parliamentary Committee local jealousies and petty animosities have their opportunity, nor are they slow to avail themselves of it.

A few striking points from the amalgamation which resulted in the formation of the old Midland Railway Company will serve to

make the seriousness of some of these difficulties plain. There were three small railway companies—the North Midland, owning 73 miles of track ; the Midland Counties, owning 58 miles ; and the Birmingham and Derby Junction, owning about 50 miles. The North Midland Company ran from Derby to Leeds, the Midland Counties from Derby to Nottingham, and the third company commencing at Derby ran *via* Tamworth and Burton to join the Birmingham and London near Birmingham.

**The Midland's
Experience.**

The three companies had been keen competitors for the business of the districts they served ; indeed the competition had waxed so fierce that about the year 1842 all three were in a very shaky condition. They were charging rates that were quite unprofitable, their management expenses were excessive, and just at that moment there was the possibility of further competition that might prove more difficult to face than that which had existed, for the Great Western Railway was contemplating an extension of its system, and the Great Northern Company was “in the air.” At a shareholders’ meeting of one of the small companies, a Mr. Heyworth ventilated the discontent of the shareholders and urged the need for a searching enquiry. Directors’ fees, he declared, cost the company £1,200 per annum. Twelve men could do the work more efficiently at half the cost. And from this beginning he stated a case which led the meeting to vote for the appointment of a committee to investigate and report on the state of the company. The outcome of the labours of the committee was a proposal of amalgamation between the three companies. There was a storm of opposition and the first scheme came to nothing. But the stalwarts persevered. After the failure to carry a scheme of combination, the competition became more intense than ever, and within a few months the financial situation was so serious that something drastic had to be done. The wiser heads connected with the companies called in George Hudson and Robert Stephenson to advise, and they reported in favour of an immediate amalgamation. A joint committee of the three companies was formed, and a bill was drafted for submission to Parliament. To arrive at this point had been sufficiently difficult, but the working out of the details of the amalgamation must have required an immense amount of both patience and tact. To take but one

difficulty: how should the respective values of the share capital in the companies be fixed?

The capital of the North Midland Company had been issued in the form of whole shares of £100 each, half shares at £40 each, and one-third shares at the curious figure of £21 13s. 4d.

Complicated Capital Problems. The Midland Counties Company's share capital was in the form of whole shares issued at £100, one quarter shares issued at £15, and one-fifth shares on which only £2 each had been paid. The Birmingham and Derby Company's capital consisted of whole shares of £100 fully paid, one-third shares issued at £25, and one-eighth shares issued at £3 18s. 5d. Here then was a Chinese puzzle of the first order. To bring about agreement among the shareholders must have been the work of a genius. The details of the negotiations are not available, but that they would make interesting reading is evident from the final compromise effected. The shares of the first two companies were all (except the one-fifth shares in the Midland Counties Company), taken at the *nominal* value; the one-fifth shares were reckoned at the amount paid on them, namely, £2 each. The Birmingham and Derby Company's capital presented peculiar difficulties; finally, however, the holders of £100 shares in the old company were allotted £95 for each in the new company. The one-third shares, nominally £25 each, were taken at £31 13s. 4d. and the one-eighth shares at £6 14s. 9d. And, in order that the work of the dividend clerks might be rendered interesting, the shareholders in the Birmingham and Derby Company agreed to accept £1 7s. 6d. per annum less dividend than the shareholders of the other two companies. These figures tell their own tale. The original thirty-four directors of the three companies were replaced by fifteen for the new company. Thus nineteen directors and two sets of staff officials were dispensed with. On 10th May, 1844, the Midland Railway Company's Act received the Royal Assent. The capital of the company was £5,158,900, and the length of track operated extended to 179 miles. This was at the time the largest railway company in existence.

The amalgamation of the multitude of small companies was bound to proceed until a comprehensive system of great trunk lines was evolved. In no other way could the country become possessed of a railway service adequate to the ever-growing needs of

its industries and commerce. How important is this possession of long through routes under a single management, and capable of conveying goods and passengers (especially the former) one or two hundred miles without change of system, will be more adequately realised later when the chapters dealing with canal economics are read. But it may be briefly stated here, as an illustration of the point, that one of the reasons why the canals of this country have failed to move with the times and have, in the aggregate, taken no larger place in the transport industry than that which they occupied half to three-quarters of a century ago, is because they have remained small fragments, connected physically at various points ; but in the matter of management isolated, independent, even jealous of their own position, and often, apparently, incapable of working together for the development of the traffic of their systems. It is impossible to conceive the conditions that would have resulted had railways remained in this same fragmentary condition. There are still some small independent railways possessing but a few miles of track, but they do not render inaccurate the general statement that from what, at this distance of time, appears a state of things greatly resembling chaos, has been evolved a complete system of trunk lines.

The original amalgamations, however, did not give us the trunk systems even as we knew them up till 1923. For instance, the old Midland Railway, when it first got through to London, had not acquired the St. Pancras terminus.

“Running Powers.”

It ran into the metropolis over the Great Northern line from Hitchin to King's Cross. Other companies obtained running powers over what may be called “foreign” lines into various important towns. The existence of these arrangements brings us to a brief consideration of the question of running powers, the creation of which marked an important step in railway history.

“Running powers,” *i.e.*, the power of one railway company to run a train over lines belonging to another company may be of two

Object of Compulsory Running Powers. kinds : (1) compulsory, or (2) by friendly arrangement. It is the compulsory powers with which we are most concerned and which mark an important step in railway history. The period with which we are dealing, it should be remembered, is the first half of the nineteenth century.

In the second decade of the twentieth century one of the common complaints against the railways was that they had entered into so many agreements and working arrangements that competition between them was dead. In the days when the amalgamations were carried out this amicable feeling did not prevail. Where a company possessed an advantage over a rival it was apt to retain its advantage if possible. In this and other ways attempts were made to "freeze" out smaller and less favoured companies. Parliament was concerned about this because one of the guiding principles on which it had acted in railway matters was that the possibility of monopolistic abuses should be prevented, not by regulation but by competition. Those were the days, of course, when belief in the infallibility of free competition shaped most of the legislation affecting trade and commerce. Parliament viewed with concern the evolution of large companies. It feared the disadvantages arising from the disappearance of competition; it realised, too, how drastic might be the consequences of the "freezing" process when carried out by large and powerful companies. Parliament considered the question, but did nothing until 1853, when a committee, the most important members of which were Gladstone and Cardwell, invented "compulsory running powers," which ultimately became embodied in the Railway and Canal Traffic Act of 1854. Parliament permitted specific clauses to be inserted in railway companies Acts giving power to them to run over other companies' lines where a connecting link was missing. The same Act required all railway and canal companies to "afford all reasonable facilities" for dealing with traffic from all other companies. From this time any company could, subject to Parliamentary approval, obtain access for its trains to the system of any other company in cases where such access was desired, and of course the "freezing" process came to an end. The fact is not solely of historical, but also of economic, importance in that it contributed to the extension of transport facilities; to the opening up of more free and larger highways of traffic for the use of the rapidly expanding trade of the country.

Friendly arrangements, *i.e.*, arrangements for which Parliamentary sanction was not sought, were not always dictated by a pure spirit of friendliness, as the name may suggest. Sometimes companies thought it desirable to grant running powers to rival

companies for fear of the greater evil of increased independent competition. It was deemed to be better policy to let a rival into

**Friendly
Running
Arrangements.**

a town rather than to force that rival to obtain its own way in. In this way the permitting company would obtain some control over the other's traffic through handling it, and it could at least make this "foreign" traffic subservient to its own requirements. An instance of this is furnished in the history of the old Midland Railway. The increase of traffic became so enormous between Hitchin and King's Cross where the two companies used the Great Northern line that the facilities for dealing with it were inadequate. Naturally, the Great Northern gave their own traffic the preference, and the Midland trains were so constantly delayed that in the end the Midland had to construct their own London terminus at St. Pancras, the Act for which was passed in 1863.

CHAPTER IV

THE RAILWAY AND CANAL AND LIGHT RAILWAYS COMMISSIONS

PARLIAMENT, though relying chiefly on the restraining influence of competition, appears to have felt all the time that the railway companies needed to be subjected to some kind of central supervision and control. At one time there was a recommendation, arising almost entirely from the absorption of its own time by railway legislation, that the Board of Trade should be given power to make a preliminary investigation of all railway schemes and to report on them. Had effective use been made of this idea possibly we should have obtained more speedily a better devised and cheaper trunk system, but two things combined to defeat this idea—Parliament was jealous of the delegation of its own powers to a department of State and the railway interest was too hostile to the idea and sufficiently powerful to defeat it. Parliament, however, had another and equally important idea—it early saw the desirability of a specially constituted tribunal for dealing with railway questions. The obligations imposed by the Act of 1854, to which reference was made in the preceding chapter, especially those dealing with “reasonable facilities,” required such a tribunal. The intention of the framers of the Act was to confer the necessary powers on the Board of Trade, but the “railway interest” was sufficiently powerful to prevent this from being carried out, and the court named in the Act was the Court of Common Pleas. This amendment stultified the Act because the judges declined to deal with purely technical questions.

The defect of the existing legislation continued to be recognised, but it was not until 1873 that another decisive step was taken in the appointment of Railway Commissioners, to whom were transferred the powers given to the Court of Common Pleas under the 1854 Act. The procedure and powers of the Commissioners were made more elastic than are those usually exercised by judges of the High Court. For instance, section 7 states that :—“When the Commissioners

**Early Methods
of Control.**

**First Railway
Commissioners.**

have received any complaint alleging the infringement by a railway company or canal company of the provisions of any enactment in respect of which the Commissioners have jurisdiction, they may, if they think fit, before requiring or permitting any formal proceedings to be taken on such complaint, communicate the same to the company against whom it is made so as to afford them an opportunity of making such observations thereon as they may think fit." The same Act gave the Commissioners power to hear and determine questions as to terminal charges where such charges were not fixed by Act of Parliament and to make orders requiring the companies to divide up particular charges so as to show the toll, the conveyance charge, and the terminal charge.

From time to time the powers of the Commission were increased as, for instance, under the Act of 1874 power was given to refer to them

**Permanent
Commission
Created.**

questions of difference required to be referred to the arbitration of the Board of Trade, or to arbitrators appointed by that Board. But the most im-

portant development took place under the Railway and Canal Traffic Act, 1888. This Act was an enormously important one, affecting railway rates and charges, as will be seen in the subsequent chapters in Part II of this book. Here we are only concerned with the Commission. The first part of the Act is entirely confined to the creation of a new Commission, called the Railway and Canal Commission (canals are brought into the title for the first time) and defining its duties and powers. This body was made permanent ; its predecessor had been appointed merely for a term of years. It was to consist of two appointed and three ex-officio members. The ex-officio members were and are required to be judges of the superior courts of England, Scotland and Ireland, and an ex-officio commissioner " shall not be required to attend out of the part of the United Kingdom for which he is nominated." The object, of course, was to secure that in whatever part of the United Kingdom the Commission might sit its presiding head should be a judge of the court having jurisdiction in that part, and, naturally, familiar with its special laws. The other two members were to be appointed on the recommendation of the Board of Trade, and " one of them shall be of experience in railway business."

The powers of the newly constituted Commission were considerably enlarged by this Act of 1888 ; for example, it was given

jurisdiction to order traffic facilities, notwithstanding any agreements into which the companies concerned might have entered. The Commission was the supreme authority for dealing with all questions as to rates and facilities. If, for example, a trader felt that he had a grievance against a particular company because it was charging excessively for services rendered, or was giving a competitor preferential treatment in the matter of rates; or if a body of traders thought a particular company was carrying imported foreign produce at rates which constituted an undue and unreasonable preference he, or they, might raise these points before the Commission.

Theoretically, the Commission was perfect, and there can be no doubt that it served a useful purpose, but the business community was not entirely satisfied with it. Its judicial and technical ability were not questioned, but criticism turned on the cost of its proceedings. For some reason (possibly because the railway companies always briefed most eminent counsel to represent them before the Commission and consequently traders felt that if their case were to be adequately expounded they must do the same), reference to the Commission came to be regarded as beyond the means of most traders. As a rule, it was only large corporations, either municipal or commercial, that brought cases in the court of the Commission. For this reason the Associated Chambers of Commerce maintained a fairly constant agitation in favour of the cheapening of the procedure for dealing with grievances against railway companies.

Brief reference should also be made to an important departure from the Parliamentary custom which had been observed for at least sixty years in connection with railways—the appointment of a Light Railways Commission in 1896. Light railways, it was thought, would serve a useful purpose in extending efficient means of transport into parts of the country not effectively covered by the ordinary railways. Although the ordinary railway system was so comprehensive and widespread there yet remained parts of the kingdom, and especially in Ireland, not adequately covered. Parliament thought the deficiencies might be made good if it encouraged capitalists to build the required lines by relieving them from some of the most arduous requirements that had always been

**Light
Railways
Commission.**

insisted on in the case of the ordinary railways. The object was sought to be accomplished by the creation of a Light Railways Commission consisting of three members to which quite novel powers were delegated, by far the most important of which had relation to the compulsory acquisition of land. For the first time in its history Parliament surrendered to a subsidiary authority its powers of dealing with the rights of landowners. Schemes for the construction of light railways are enquired into by this Commission, and if passed are formally reported to the Board of Trade for its approval, and on this being given a scheme requires no further sanction. The proposed company can acquire the land required by means of compulsory purchase and can proceed with the construction of the light railway. Other departures from previous custom are that the Commission may, and does, hold enquiries into schemes in the localities affected which, of course, means the reduction of the expenses of the application because witnesses are on the spot and have not to be conveyed to and maintained in London during the time the enquiry lasts. The Act also provides for the co-operation of the State, the locality, and private enterprise for the provision of such lines, and, further, power is given to the Treasury to render financial assistance where it is satisfactorily proved that the localities proposed to be served are so poor that otherwise the scheme would be impossible. This Government assistance can be made in the shape of an out-and-out gift, or of a debenture loan bearing interest at $3\frac{1}{2}$ per cent.

Of course, it follows that the schemes for which Treasury assistance was intended were those mainly promoted by local authorities. A private venture for profit could not claim to reap the benefit of such financial provisions. But as a matter of fact, light railways have been principally constructed by private enterprise. Populous urban localities have usually adhered to the more familiar street tramways; sparsely populated suburban and rural localities have usually been either too poor or too lacking in enterprise to take the initiative themselves. While making these special arrangements for simplifying procedure, and reducing costs of promotion and construction, Parliament took care to protect the ordinary railways from the competition of great lines of railway constructed under them, and the Commissioners have rejected

**Not a
Conspicuous
Success.**

attempts to use these facilities for the purpose of creating competition. The aim was to supplement the existing railways by covering the country with which they were not closely connected, and not to provide new trunk lines to compete with those already in existence. But it cannot be said that on the whole this departure from long established custom has been conspicuously successful. There has been some success in Ireland, but in England, at any rate, many of the schemes (the majority in fact) have amounted to little more than passenger-carrying tramways with their lines running along public roads. Ordinary limited companies promoted by private enterprise have found the provisions of the Light Railways Act a cheap and convenient method of obtaining sanction for suburban tramway schemes. They have taken powers to carry goods and merchandise as well as passengers, but, as a rule, the goods business transacted has been infinitesimal compared with their passenger business. Even in some sparsely populated districts, where so-called light railways have been constructed, the result has been much the same. The fact is that private enterprise is not attracted by benevolent schemes for rural development. In the slang expression of the day, it is "out for" business and profits; and the rural districts to which light railways should have been most useful have not, as a rule, the enterprise necessary to spur them on to such undertakings or the ability to carry them through. Whatever else it may be, a railway whether "light" or "heavy," is not a philanthropic, but a business, undertaking.

CHAPTER V

THE SCOPE AND PURPOSE OF WORKING AGREEMENTS

ONE other important stage in the evolutionary process must be dealt with before leaving this brief historical sketch of British railways.

The Era of Fierce Competition.

It has already been pointed out that at the outset Parliament fostered competition by means of a multitude of small lines, and that the next stage of development was the evolution of the large com-

panies controlling great trunk lines. This did not in the least diminish the competition which Parliament desired. Rather it fostered it by transferring it from small bodies to large, powerful, wealthy corporations capable of large undertakings and large policies. The period which followed saw the fiercest possible competition. In even these early days there was at least one instance of an alliance, but in the main it was the era of keen business antagonisms. The companies, it is true, all worked to one classification of merchandise and to maxima schedules imposed by Parliament, and occasionally they entered into agreements for the regulation of passenger fares, especially those for excursion traffic.

Beneath this apparent uniformity, however, there was much room for competition in the matter of facilities. Passenger services

Nature of the Competition.

were duplicated, and the companies endeavoured to outvie each other in speed and comfort of travel. In the goods department all kinds of concessions were made in order to secure traffic. One

of the most notorious methods concerned the generosity with which claims for damage, misdelivery, and delay were treated. If the company protested against a claim which was regarded as excessive the trader's invariable retort was: "Oh, very well. If you don't care to pay my claim the whole of my traffic will be transferred to your rivals." Such a method of squeezing the companies was singularly successful for years, until in fact the trader came almost to regard it as a legitimate means of securing what amounted to an indirect reduction of goods rates and charges. Another direction in which the influence of

competition was seen was in the laxness with which charges for warehousing goods or for the demurrage of trucks were enforced. The regulation free limits for warehousing or the detention of trucks were systematically exceeded. Again, the companies would carry goods at the reduced "owner's risk" rates, and in case of damage, loss, or misdelivery would not too strenuously resist a claim, although, in the strict letter of the law, the lower rate given was in consideration of the consignor himself undertaking these risks.

Ultimately the companies became tired of this policy and began to act together to enforce warehouse and demurrage charges and to resist claims. It caused a great outcry because the effect of this change was to add to the traders' transport bill, and naturally this was vigorously resisted. The opposition was not conspicuously successful, and the companies, having thus drawn closer together than they had ever done before, began to draw even closer still, until the outcome was the arrangement of several working agreements.

**Companies Draw
Closer Together.**

Working agreements were not, even at that time, entirely novel in the history of British railways. Parliament itself had sanctioned one in the case of the London, Chatham, and Dover and the South Eastern companies under which the management of these two railways was vested in a joint committee drawn from the two boards of directors. Thus, though the companies retained their separate identities their systems became as one. Their receipts were "pooled" (*i.e.*, paid into a common account), and their net profits divided on a proportional basis. From the sum which each company thus received from the joint managing committee, dividends were paid to stockholders. It is also interesting to find that as early as the "seventies" of the nineteenth century there was a working agreement (not sanctioned by Parliamentary authority and little known of generally) between the London and North Western and the Lancashire and Yorkshire railways. Under this the two companies "pooled" the receipts from certain traffic at "competitive points" (*i.e.*, the traffic arising in places which both companies served) and divided them on a fixed basis.

**Early Working
Agreements.**

It was on these lines that the agreements of the first decade of the twentieth century were based. There were several in existence. For instance, the London and North Western, the

Midland, and the Lancashire and Yorkshire companies worked under such a system. This triple arrangement was not made all at once. That with the Lancashire and Yorkshire, **A Railway Triple Alliance.** as has been said, had been in existence for about a generation, and it had been extended in 1906 when more traffic was brought within its scope. The next step came in 1908 when the North Western and Midland came together, but for a time the arrangement was confined to these two ; it did not extend to the Lancashire and Yorkshire. Within a very short period, however, the Midland came into full working arrangements with the other two companies. This tri-party combination only concerned "competitive traffic," the receipts from which were "pooled" and divided on a proportional basis. The exact details of the arrangement were not well known outside the offices of the companies concerned and even there only in those departments directly interested, but it appeared to be very widespread, covering all goods, parcels, and passenger traffic at points where the three companies were in competition.

Some idea of its effect may be obtained from the following circular issued by two of the companies in districts where they alone are concerned. Had the third company been affected, of course its name would have been added—

LONDON AND NORTH WESTERN AND MIDLAND RAILWAYS

PARCELS TRAFFIC

WOLVERHAMPTON AND WALSALL

The London & North Western and Midland Railways beg to inform their Customers in Wolverhampton and Walsall that commencing Monday, October 12th, 1908, the collection and delivery of Passenger Train Parcels will be performed by joint vans, and that the parcels traffic of the two Companies will be under the control of their joint Agents, Mr. W. H. HICKMAN, at Wolverhampton, and Mr. A. PLANT, at Walsall, respectively, who will be responsible for the Collection of the Carriage Accounts of both Railways and to whom all applications relating to the parcels business of either Company should be addressed.

The traders may rely that their traffic will be as promptly and efficiently dealt with as it has been in the past.

FREDERICK HARRISON,
General Manager, L. & N.W. Rly.

W. GUY GRANET,
General Manager, Midland Rly.

*Euston Station,
London, October 7th, 1908.*

How passenger traffic was affected may be seen from the arrangements concerning "season" or "contract" tickets. A holder of a London and North Western season ticket between, say, Wolverhampton and Birmingham, or between Walsall and Birmingham, or between Sutton Coldfield and Birmingham might travel between the two terminal points covered by his ticket in the trains of either company. Similarly, of course, a Midland season ticket-holder might travel by North Western trains. The only restriction was that if travelling on the line which had not issued the season ticket the journey could not be broken at stations between the terminal points. Of course, on the issuing line the journey might be broken anywhere between the terminal points. In some respects the privileges applying to ordinary tickets were even greater than those applying to season tickets. In addition to this agreement there was a very close one between the Great Central, Great Eastern and Great Northern companies, and the last two had a working arrangement with the Great Western at certain points. The Great Western and the South Western had a working agreement, and so had the Scottish companies.

It will be seen, therefore, that the movement in the direction of eliminating competition had developed to a considerable extent.

**Benefits to the
Companies.**

From the point of view of the companies, of course, such arrangements are all to the good. They mean an appreciable reduction of working expenditure through the abolition of duplicate services of all kinds. In some, if not all, cases, the number of passenger trains was reduced, and it is claimed that this was done without inconvenience to the public because the trains of the companies concerned were better arranged and better spread over the day. In connection with goods and merchandise traffic, of course, these alliances meant a reduction in the money formerly spent on "getting traffic" and on collecting parcels, for instance. The companies themselves stated that such economies had become desperately necessary. The circumstances of their development in the last decade or two of the nineteenth century had added enormously to their capital accounts and frequently the expenditure was upon enlargements, which, while imperatively necessary for the handling of traffic, did not result in an increase of earning power,

or a decrease in working expenditure, proportionate to the capital expenditure. Further, there had been, they asserted, a steady increase in operating expenses arising from a variety of causes. These things were impairing, and threatened to do so still more, their ability to maintain their dividends, and, unless some counteracting move were made, would ultimately mean the diminution of dividends.

From the point of view of traders, these arrangements appear, according to their published statements, to possess few advantages and many disadvantages. Of course, they put

**The Trader's
Point of View.**

an end to the former astute policy of setting company against company ; that device was no longer

available to the man in search of a concession. It was also stated that there had been an appreciable reduction in facilities, the real effect of which was equivalent to an increase in the charges for transport. Naturally, the trader argued that he was not any more able to meet such increases than were the railways to meet those directly affecting them. On the surface it does appear as though all the advantages accrue to the companies and none to the traders, but a superficial view of a matter of this sort is scarcely adequate. If the position of the railways which induced them to enter into such working arrangements was as has been stated by them, then it is obvious that it would not have been to the real and lasting advantage of the community that it should continue. The industry of transport cannot, any more than any other, be expected to deny itself a legitimate return on the capital it employs. If such denial is insisted upon, the industry must ultimately become unattractive to capital which will cease to become available to meet future requirements of the industry. The consequences of such a condition would inevitably be the stagnation, and following that the retrogression, of the industry. Whatever else the industries of this country may face, they cannot contemplate with equanimity a retrogressive or even stagnant transport system.

CHAPTER VI

THE FINAL STAGE OF AMALGAMATION

It will have been seen from the three preceding chapters that, notwithstanding the recognized object of Parliament to secure a more or less automatic antidote to the abuse of monopoly by the fostering of competition, there had developed a marked drifting together of the various companies on well recognised lines governed to a considerable extent by geographical considerations. How far this might have gone cannot be conjectured, because the European War of 1914-1918 drew a great dividing line across railway history, ending a well defined period and opening another. The exigencies of war were responsible for this. They required that in the interests of the nation all minor differences of management and control, all rivalries, all eccentricities of traffic manipulation should cease, and that the whole of the systems of the country should become as one for war purposes.

The Great Dividing Line.

This was no casual, hastily formed conclusion; the necessity for it was recognised some time more than half a century ago, for in 1871 a "Regulation of the Forces Act" was passed, which by Section 16 enacted that: "When Her Majesty (*i.e.*, the late Queen Victoria) by Order in Council declares that an emergency has arisen in which it is expedient for the public service that Her Majesty's Government should have control over the railroads in the United Kingdom the Secretary of State may by warrant under his hand empower any person or persons named in such warrant to take possession in the name, or on behalf of Her Majesty, of any railroad in the United Kingdom and of the plant belonging thereto and to use the same for Her Majesty's service at such times, and in such manner, as the Secretary of State may direct."

A Long Foreseen Essential.

The development of this control as years proceeded is really more a matter of war politics than of railway economics, but the ultimate result of it extended so far beyond the region of War policy into the region of railway economics, that it is worth while tracing the stages of this evolution.

The Development of the Control.

So far back as 1865 an Engineer and Railway Staff Corps had been organised. This was a voluntary body consisting of the chief executive officials of some of our railways. The duty of this committee was to make itself conversant with all operations connected with the transport of troops and military equipment by railways, and especially to consider, and be prepared for, the eventuality of war. This was done in no Jingo spirit, but should be looked upon as a wise provision in case of hostilities, which, under modern conditions, were showing a tendency to break out suddenly and with a minimum of warning. For thirty-one years the Engineer and Railway Staff Corps was in being, carrying out quietly and unobtrusively the important work for which it had been established. Then a new body was set up, called at first the Army Railway Council. On this body the War Office depended for the drawing up of mobilisation time tables, which had to be kept up to date and in a thoroughly workable condition. It also had the responsibility for keeping in touch with the latest developments on the subject of war-time transport. Both the Admiralty and the War Office were in contact with this Council, which was renamed in 1903 the *War Railway Council*, and kept it informed of all the latest developments connected with its possible sphere of action. The *War Railway Council* at the end of ten years, viz., in 1913, gave place to a *Communications Board*, representing not only the Railway Companies but all those Government Departments which would be brought into relation with the railways in the event of war breaking out.

In the year 1912 the Government had decided to establish a Railway Executive Committee, which should have the actual control of our railways during a war. This was to consist of the General Managers of the great railways, the personnel of this on the outbreak of the war in 1914, being Sir Herbert Walker, General Manager of the London & South Western Railway, Acting Chairman (the *ex-officio* chairman being the President of the Board of Trade), and the General Managers of the following companies: The London & North Western, Midland, Great Western, Great Northern, Great Central, Lancashire & Yorkshire, North Eastern, South Eastern & Chatham, and the Caledonian.

It has often been a subject for wonder that the arrangements for despatching the *Contemptibles* worked apparently so smoothly

in those first days of the war; fortunately the efforts of nearly half a century were not wasted, nor had our responsible railway authorities been caught napping. The necessary plans and time tables had been kept up to date, ready for an emergency. Thus when the emergency did arise we were prepared¹ so far as transport arrangements were concerned.

Immediately war was declared the Government acted under the powers conferred on them by The Regulation of the Forces Act, "**Commandeered**" 1871, and took possession of most of the railways of the country. The official announcement on the subject issued by the Board of Trade was as follows—

**GOVERNMENT CONTROL OF RAILWAYS:
TERMS OF COMPENSATION.**

The Regulation of the Forces Act, 1871, under which His Majesty's Government have taken possession of most of the railroads of Great Britain, provides that full compensation shall be paid to the owners of the railroads for any loss or injury they may have sustained thereby, the amount of such compensation to be settled by agreement or, if necessary, by arbitration.

His Majesty's Government have agreed with the Railway Companies concerned that, subject to the undermentioned condition, the compensation to be paid them shall be the sum by which the aggregate net receipts of their railways for the period during which the Government are in possession of them, fall short of the aggregate net receipts for the corresponding period of 1913. If, however, the net receipts of the Companies for the first half of 1914 were less than the net receipts for the first half of 1913, the sum payable is to be reduced in the same proportion. This sum, together with the net receipts of the Railway Companies taken over, is to be distributed amongst those Companies in proportion to the net receipts of each Company during the period with which comparison is made.

The compensation to be paid under this arrangement will cover all special services such as those in connection with military and naval transport rendered to the Government by the Railway Companies concerned, and it will, therefore, be unnecessary to make any payments in respect of such transport on the railways taken over.

BOARD OF TRADE,
15th September, 1914.

This announcement, it will be seen, says more about the financial than the operative side of the arrangement, though possibly the latter may be regarded as the more interesting from some points of view. The financial side of the arrangement was peculiar, and pressure of circumstances made its variation necessary. For instance, in March,

**Financial
Arrangements.**

¹ See *British Railways in the Great War*. E. A. Pratt 1921.

1915, railwaymen's wages were increased and it was agreed that the proportionate deduction which was to be made "if the net receipts of the companies for the first half of 1914 were less than those for the first half of 1913," should not be made, but "that 25 per cent. of the war bonus granted to railway employ  s who come within the railway conciliation scheme should be borne by the railway companies and not by the Government." The long continuance of the war and its consequent holding up of necessary works of renewal and extension also called for some modification of the original agreement, and the companies were permitted to make provision for these necessary works before arriving at the balance of their net receipts, even though the renewals or extensions had not been, and could not be, carried out.

These modifications, however, did not affect the principle of the arrangement which set up a standard of net receipts, or profits, and as actual profits under the control fell below those of the standard period, the contribution of the Government under the guarantee increased or diminished. The effect of the arrangement was two-fold. On the one hand it secured the financial position of the companies. Whatever might happen under the control, the monopolising of their services by Government traffic, or the curtailing of their facilities for public transport owing to the exigencies of the war, their former financial position was to be maintained. On the other hand, the guarantee relieved the Government from the necessity of paying directly for the work done on their behalf, such as the running of troop trains. This must have been an enormous convenience and a great saving of labour.

The railways became one system so far as war traffic was concerned (the movement of troops, ordnance, stores, and the ten thousand and one things used in the war), but the ordinary business of the companies went on as before, subject, of course, to the requirements of the war traffic. The administrative and operating staffs remained the same, except for the depletions arising from the war; the general managers and Boards of Directors remained the same, except, of course, for such changes as arose through the effluxion of time (which would have happened in the ordinary course had there been no war), or through the Government "borrowing" the services of railway officials for other work. For instance, the

Operating Arrangements.

original Coal Controller was Sir Guy Calthrop, General Manager of the London and North Western Railway Company, and the staff of that department included many railway officials. None of the old organization of the railways was dispensed with. On top of it, however, was imposed the small executive committee before referred to composed of railway officials and directors who had absolute and unquestioned control of all the systems taken over so far as war traffic was concerned; and as time elapsed their control extended in other directions. To them the requirements of the War Office were notified, and they had to organize the necessary transport and issue their orders to the various companies affected. In this way the former barriers between the companies were broken down, and the different systems worked as a single unit where Government traffic was concerned. Troop trains passed from one system to another without any of the previous formalities being observed; in effect there was no "foreign" rolling stock on the lines. The sole consideration was to get the Government traffic over the quickest, or most convenient, route, irrespective of the number of the different lines over which it passed.

It will be seen, therefore, that during the war there was virtually a State railway system, but it was a State system with a difference.

**A State System
with a
Difference.** The arrangement was, of course, an immense convenience to the Government, in fact it was an indispensable necessity for the proper conduct of the war; but the experience gained has been

of no value to the student of that perplexing problem, the State ownership of railways. This aspect of the problem, as well as the general effect of Government control during the war will be more appropriately dealt with in the chapter on State Railways.

The point of importance here is to bring out how this war control led, naturally as it seems now, to a further great amalgamation of separate systems into four main groups. The unification of control over war traffic was the first step in this direction; the second was the creation of a Ministry of Transport. From the point of view of the general public the unification produced by the war had not very much to commend it to favour. To them it meant many inconveniences which were submitted to with more or less patience because of the grave emergencies which were the root cause of all

**The Ministry
of Transport.**

the curtailments and restrictions. To the men behind the scenes, however, unification was evidently seen to be of enormous advantage in the conduct of the war, and doubtless their experience and knowledge of what was being accomplished led to the modification of inherited ideas as to the supreme advantages arising from the competition of a multitude of independent companies. It was a remarkable change of opinion, for which no doubt the freshness of mind brought to bear on railway problems by the newly formed Ministry of Transport was largely responsible. There had always been more or less of a Ministry of Transport (in fact if not in name), because railway and canal affairs were supervised by the Board of Trade at the head of which, of course, is the President, who is a Minister, and usually, though not necessarily, a member of the Cabinet. The new Ministry, however, took all these affairs out of the hands of the Board of Trade, and further powers were added—for instance, the general supervision of roads and road transport. Originally it was suggested that the Ministry should have still wider powers, and though Parliament did not go all the way with these proposals, it gave it a much wider sphere than that formerly possessed by the Board of Trade. It was given much greater power in initiating reforms, for instance.

One of its first acts was to outline a scheme for the amalgamation of the railway systems of the country into five great groups. It

**A Great
Amalgamation
Scheme.**

was a remarkable indication of change in responsible opinion towards the railways. The White Paper in which the scheme was outlined is given in full in an Appendix. Here it is only necessary

to set out the groups as originally proposed—

1. *Southern*, combining the South Eastern and Chatham, the Brighton, and the South Western.
2. *Western*, the old Great Western system with the Welsh lines.
3. *North Western*, combining the London and North Western, the Midland, the Lancashire and Yorkshire, North Staffordshire, and Furness.
4. *Eastern*, combining the Great Northern, the Great Central, and the Great Eastern.
5. *North Eastern*, the North Eastern and the Hull and Barnsley.
6. *London Group* (local lines) and a
Scottish Group for the whole of Scotland.

A careful study of the whole document will well repay the time spent on it. The proposals were revolutionary in their extent, and aroused some criticisms, but on the whole the idea was favourably received, because it was believed to hold out the possibility of more economical working in the future. There was also approval of most of the proposals under the heading—"Future powers of the State in relation to railways," particularly those which dealt with standardization of permanent way, rolling stock, etc., and the requirement of co-operative working and the pooling of traffic and receipts where competition caused waste.

The scheme did not receive Parliamentary sanction until 1921, when the Railways Act (11 and 12 Geo. V., Ch. 55) was passed.

Much information as to that Act is contained
The Scheme
Finally Adopted. in the Appendix, but as the groupings differed from those originally foreshadowed it will be useful to set them out here.

1. *The Southern Group*, called the Southern Railway, and comprising the following companies—the London and South Western, the London, Brighton, and South Coast, the South Eastern, the London Chatham and Dover, and the South Eastern and Chatham Managing Committee.

2. *The Western Group*, called the Great Western Railway, comprising the following companies—the Great Western, the Barry, the Cambrian, the Cardiff, the Rhymney, the Taff Vale, and the Alexandra (Newport and South Wales) Docks and Railway company.

3. *The North Western, Midland, and West Scottish Group*, called the London, Midland and Scottish Railway, and comprising the following companies—The London and North Western, the Midland, the Lancashire and Yorkshire, the North Staffordshire, the Furness, the Caledonian, the Glasgow and South Western, and the Highland.

4. *The North Eastern, Eastern, and East Scottish Group*, called the London and North Eastern Railway, and comprising the following companies—the North Eastern, the Great Central, the Great Eastern, the Great Northern, the Hull and Barnsley, the North British, and the Great North of Scotland.

Of course, a multitude of minor companies was also absorbed into these four main groups, the details of which are given in an Appendix. Prior to this Act there were no fewer than 214 separate companies, of these 121 were amalgamated into the four groups.

The new nomenclature is still slightly unfamiliar, and occasionally confusing to the older generation. Only one old name, the Great Western, survives, and one regrets, for sentimental reasons, that the London and North Western, the Midland, and other well-known and deservedly popular systems are now absorbed into bigger companies with less familiar names.

CHAPTER VII

RAILWAYS OF THE UNITED STATES

It is quite impossible to attempt a detailed description of the railways of the United States. Their extent is too vast for such a task to be accomplished within the limits of a book designed to take a comprehensive view of the whole subject of transport. Quite a substantial volume would be required to deal with the subject on such a scale. Some idea of the extent of the railways of the United States may be obtained from a comparison of figures with those for Great Britain. In 1922 there were in the United States 250,413 miles of road against 20,390 miles (excluding sidings, etc.) in Great Britain in 1925; the total capital was \$22,290,000,000 (say, roughly, £4,580,000,000) against £1,177,417,650; the operating revenue was \$5,559,093,000 (say, £1,111,818,000), against our receipts from traffic of £199,652,875; the net revenue from railway operations was \$1,144,570,000 (say £228,914,000) against £34,628,863; tons carried 1,974,618,000 against 315,951,240, and the average receipt per ton mile from freight was 1.194 cents compared with 1.439 pence. In all cases the American figures are for 1922 (the latest accessible), and the British for 1925. In short, the system is the largest in the world, and though there may still be relatively small untouched areas, it is not inaccurate to describe the country in the somewhat hackneyed phrase as covered with a network of railways. If it is desired to realise this, it is only necessary to procure a "folder" from one of the shipping agents—Cooks, for instance. A "folder" is an American railway main line time table—called "folder" because it is arranged so as to be capable of being folded up for the pocket. Some of the companies supplement the time table with a railway map. Their own system is brought into prominence by means of a heavily emphasised line with the curves flattened out and the route made to look as direct as possible. While this is done, however, it is not unusual to find the whole railway system of the country lightly printed in. From such a source as this may be obtained a vague but useful idea of the national system as a whole. Merely to inspect a map of this kind is instructive.

The history of the development of the railways of the United States is very different from that of this country. England was a settled country with a large population and many towns. Outside the towns the country was well developed agriculturally. These conditions possessed advantages and also disadvantages. Under the first of these descriptions have to be placed a number of facts. Agriculture, commerce, and industry, were more or less flourishing when estimated by the circumstances of their time. They were awaiting the stimulating influence of extended, improved and more rapid means of transport. Trade was ready for the railways and their main routes were settled for them. One of the first and most obvious tasks before the pioneers was to connect up centres such as Liverpool and Manchester, London and Birmingham, London and Bristol, and Liverpool and Birmingham. And, of course, there were other towns in the northern midlands and the north east for which similar facilities were required. The disadvantages may be summed up in the cost of construction arising from this settled, developed condition of the country. Land was being used and consequently expensive to acquire, apart from the manner in which costs were piled up because of antipathy and cupidity. The procedure necessary to acquire Parliamentary sanction for the various projected lines was another heavy item of expense.

**A Contrast
with England.**

In complete contrast to this were the conditions prevailing in the United States. Except on the coast lines, or the banks of the great rivers, and the lakes, the country may be described without exaggeration as unsettled. One of the authors possesses an old school atlas dating from somewhere early in the nineteenth century which marks a great portion of what are now the States of Nevada and Utah as "desert." In the United States, therefore, railway construction, except in the eastern populated regions, was entirely pioneer work. The lines were constantly being pushed out westwards in advance of the population and then the pioneers set to work to obtain populations for the regions they had opened up. It was, therefore, a very different problem that confronted railway promoters in the United Kingdom and the United States. In the latter country they passed comparatively soon from the populous places, where

**Opening Up
New Regions.**

their success was as certain as it could be, to regions where every yard of track laid was a purely speculative undertaking. The pioneers there, however, had every inducement given to them. There were no restrictions as to the kind of track which should be laid or of rolling stock which should be used ; and there were no landlords to be conciliated. In fact, the State was so anxious to get railways pushed out into the prairies that it commonly gave not only the land for the road-bed but considerable tracts on each side of the line, so that the companies might reap the full benefit of their enterprise. And the tracks laid in these pioneer days were far below the standard required in the United Kingdom even at the same time ; in fact, here they would have been regarded as most primitive and dangerous to the travelling public. The story of the development of these pioneer lines would make most interesting reading were there space to tell it. It was not always successful at the outset. Some lines came to grief financially because they were so far in advance of a paying population ; some were more or less wild cat schemes ; and the ultimate ending in such cases was liquidation. But as far as the country was concerned these failures were mere incidents in what may now be described as a history of almost uninterrupted progress. Companies that did the pioneer work may have failed ; but others took their places and carried on the work to success.

It is difficult, if not impossible, to divide up the history into periods as can be done with English railways because development continued so long. Until quite recent years one of the chief tasks still before the railways was the opening up of new country. In the main, however, there were the two stages—(1) construction, (2) consolidation—just as there were here. The only difference is that the two stages overlapped, or ran side by side. Many prominent names in the financial and railway world have been conspicuous at various periods in the work of consolidation. Two only of the more recent ones need be mentioned—Hill and Harriman. Mr. Harriman was the central figure in the amalgamations which created the Union Pacific line and took it out west to the Pacific Ocean. Mr. Hill with Lord Mount Stephen and Lord Strathcona acquired the control of certain scattered railways and combined them to form the St. Paul, Minneapolis, and Manitoba Railway. In 1889 it

Construction and Consolidation.

was decided to push on this system also to the Pacific, and the name was then changed to the Great Northern Railway.

The power and authority of railway magnates such as these were and are immense. How they acquired it is not easy to state in general

terms because every transaction of the kind would have its points of difference. But one of the cir-

**Power of Railway
Magnates.**

cumstances which frequently assisted this acquisition of one-man control may be found in the nature of the capitalisation of American railways. Frequently the common stock (which in this country would be called ordinary capital) was small in relation to what are called Bond issues—similar to British debentures and guaranteed stock. As with ordinary capital here the voting rights are mainly confined to common stock. Bondholders only have power of intervention and control through the appointment of a receiver when there is failure to pay the interest due to them and the particular railway is insolvent. Normally, therefore, control is in the hands of common stockholders, who appoint directors. To obtain control of a company, under such circumstances, the magnates had not to consider great bulks of capital. All they were concerned with was the common stock, and a bare majority of this (even a one-share majority) was sufficient to give them effective control of the company under which they could appoint themselves or any other nominees as directors, and thenceforward shape the whole policy of the company.

In this and similar ways one-man control was secured. Its influence cannot be unreservedly approved or condemned. On the one

**Advantages
and Defects.**

hand, it undoubtedly had its good features. It placed the control of huge developing organisations in the hands of strong men ; men of dominating personality, of imagination and enterprise ; men who conceived great schemes and carried them through in a way that probably would have been impossible under any other conditions. But while the system had advantages such as these it undoubtedly had counterbalancing defects arising from the manner in which it was abused. Much of the scandalous Stock Exchange manipulation of railway stocks, which time after time has brought ruin to thousands of small investors, may be traced to this source. And the State has found cause to interfere in these arrangements and

to exert its authority to quash them because of its conviction that they are antagonistic to the interests of the public.

Apart from the initial one of how to get a comprehensive system of railways, the problems which the United States have had to solve

**Problems for
the States.**

have been very similar to our own—the prevention of the abuses of monopoly and the regulation of rates. Competition as a regulating force keeping both these kinds of abuses in check is bound to have its weaknesses ; to produce irregular and uneven results. The localities enjoying the advantage of being served by more than one system are bound to obtain great benefits from competition as long as it remains free and unrestricted by any form of working agreement. And of themselves such benefits are equally bound to have what may be called a reflex effect. The transport rates which some localities enjoy are so much lower than those available for others, where competition does not exist, that, inevitably, there must be an appearance of unfair discrimination in favour of one locality against the other. Apart from this condition, which may be described as natural or inevitable, it is also alleged against the railways of the United States that in their efforts to secure transport business they have deliberately discriminated in favour of the consignor who could hand them large tonnages at the expense of the smaller man. Into the merits of this particular phase of the dispute it is not necessary to enter ; it is only mentioned as an indication of the kind of problems with which the legislatures of the Union and of the individual States have been constantly faced.

The trouble began early in the second half of the nineteenth century. The expansion of agriculture fostered by railway develop-

**The “Granger”
Movement.**

ment had been so rapid that wheat prices fell considerably, and with the existing railway rates farmers were unable to make a profit. From the point of view of the railways the reductions demanded would have meant disaster, but unwisely they did not rise to the necessity of doing something useful to help the settlers whom they had planted on the soil. Naturally in this crisis the indignation of the farmers became acute. In 1867 there had been formed a society known as “The Patrons of Husbandry,” the object of which was the social improvement and industrial betterment of agriculturists, though those interested in other industries eventually joined.

The object was mainly educational. The meetings of the local branches were held in granges or barns, and so the lodges came to be known as granges and the whole movement as "the Granger movement." Naturally a body of this kind, formed on the lines of a secret society, and having the care of agriculture as its primary object, began to take a considerable interest in the position as between the railways and the farmers, until in the end, the society promoted laws against monopolies, which were primarily directed against the railways, and ultimately became known as the "Granger laws." These were passed in the States of Illinois, Iowa and Minnesota. There was in 1870 an unfruitful attempt in Ohio to regulate railway goods rates by law, and in the following year in Illinois a law was passed setting up a series of maximum charges. One of the judges declared this to be unconstitutional, and as the result failed to obtain reappointment. His defeat showed the true significance of the movement. The farmers were seeking what they believed to be their "rights" and the salvation of their industry; and naturally they were in no mood to tolerate technical points which might be raised to set aside the legislative expression of their convictions and intentions.

The difficulty was overcome in an Act passed in 1873 which did not fix maximum rates but required them to be reasonable, and a Commission was appointed to settle what were reasonable rates. Minnesota and Iowa followed this example. Wisconsin went farther, and in the "Potter law" fixed rates on various goods at levels that were declared to be unremunerative. Of course the railways contested the validity of these laws, but in 1877 the Supreme Court pronounced them constitutional. Thus the "Grangers" were successful in enforcing their views, but their success proved to be short lived because experience soon showed that the restrictive laws so diminished the earning powers of the companies that they became unprofitable undertakings. In Wisconsin the general level of goods rates was reduced to those prevailing at competitive points, and in two years none of the railways was able to pay a dividend, and only four were able to meet the interest due on their issues of Bonds and other prior charges. The inevitable result followed—capital was not forthcoming for extensions which came to an end for the time being and the State ceased to develop. So

severe was the crisis provoked by the "Granger Laws" that even before the Supreme Court upheld them in 1877 they had come to be regarded as unwise, and it was realised that it would be bad policy to enforce the decision.

Of course the breakdown of the "Granger Laws" did not mean the end of all attempts to control railway rates and policy. The necessity for such control had been made abundantly evident by the experiences which had spurred the traders on to action. But while the necessity was recognised, it was about ten years before an acceptable policy was agreed upon, and in all this decade there were frequent legislative attempts on the part of individuals and much wrangling over the merits of rival policies. One of these proposals was the enforcement of strictly equal mileage rates—an attractive scheme because of its superficial appearance of all-round equity, but one which in practice is incapable of strict application for reasons which will be seen later in the chapters dealing with the economics of transport. The ultimate solution of the difficulty was found in the creation of the Inter-State Commerce Commission in the year 1887. By this Act the regulation of railways became national rather than local. Their control was handed over to the Commission, "pooling" was prohibited, and there was a clause with reference to the relationship of "through" to local rates, the object being to give the Commission wide, if not very exact, powers of minimising the abuses which arose from the granting of exceptionally low through rates while local rates for the same commodities over part of the same route as the through rates covered were maintained at their high level. Great discretion in the matter of discriminatory rates and of the long and short haul charges was left to the Commission.

That body appears to have tackled its work with vigour, so much so that for ten years, according to a paper read by Professor E. R. Dewsnup (University of Illinois) at a congress of the Royal Economic Society in London in 1912, it assumed the right to order the companies to fix reasonable maximum rates. It was inevitable, of course, that when such a policy was resisted in the courts it failed, and for eight years the Commission repeatedly sought such powers until they were granted in 1906. This power was further extended in 1910 when

**The Inter-State
Commerce
Commission.**

**Its Powers and
Duties.**

authority was given to fix reasonable maximum rates even though no complaint might have been brought before the Commission. In the same Act the commissioners were authorised to postpone new rates proposed by companies, while enquiry was made as to their reasonableness and more complete control was given over long and short haul rates. But perhaps one of the most important enactments was that where a company reduced rates in competition with a water route it should not be allowed subsequently to increase those rates unless it could show changed circumstances other than the elimination of the water competition as the justification for its action.

Apart from this rate regulation, however, the Commission is endowed with a variety of powers. It is the authority for enforcing compliance with requirements as to equipment such as brakes and automatic coupling appliances; for regulating the carriage of explosives; for regulating the hours of the operating staff; for arbitrating in case of labour disputes on the railways, and for a variety of other things. And there is, apparently, an increasing tendency to seek its opinion on all kinds of subjects connected with the railways, while its power of control is extending indirectly from Inter-State matters to those which formerly were regarded as the sole concern of the States themselves. Obviously it must be so because if the Commission orders certain things with reference to Inter-State traffic its decision cannot be allowed to be invalidated or infringed by the fact that a State has not enforced similar laws within its own boundaries. Such an admission is merely logical.

It is difficult at a distance far removed from the sphere of the Commission's activities and without close personal acquaintance with it to pronounce an opinion as to the value of its work. It can hardly be doubted that from many points of view it is an extremely useful department of State, but against the advantages are to be set one or two disadvantages. At times there seems to be about its procedure a suggestion that it is a political rather than an administrative and judicial body; that the public opinion of the day shapes its policy and decisions rather than the letter of its constitution. Another serious allegation against it is that it shows tendencies to become bureaucratic, afflicted with the worst faults of bureaucracies,

**Value of its
Work.**

arrogance, and rigidity ; a tendency to fix stereotyped rules of action and to interfere despotically with matters that are not strictly before it. But in all these things it is difficult to strike the happy mean between inefficiency and officiousness ; and it will always be so.

Before leaving the railways of the United States it seems desirable to add a few words as to their present stage of development.

**Present Stage
of Development.**

The system has already been described as the largest national system in the world. And anyone who has little more than a bowing acquaintance with its history, extent, and achievements will agree that from some points of view it is also one of the most efficient, best organised, and cheapest systems in the world. It moves an immense volume of goods traffic and the average rate per ton per mile charged for the work it does is the lowest in the world. It has its defects, of course, and at times it has been made the instrument of grave abuses. All the advantages claimed for it are not always admitted by critics and rivals, but when allowance is made for all the defects criticised it still remains a wonderful system ; one which has played a vastly important part in the development of a country of immense possibilities and is still ministering capably and efficiently to its further development, not merely internally, but externally, in the commerce of the world.

CHAPTER VIII

THE EUROPEAN RAILWAYS

RAILWAY conditions in Europe are quite different from those of the countries already dealt with. The United Kingdom of Great Britain and the United States of America obtained their

Prevalence of State Ownership. railways entirely as the result of private enterprise, although, as has been seen, relatively small but valuable assistance in the shape of land grants was given to the pioneer American railways. European countries have obtained their railways largely as the result of State enterprise. At the outset there was some measure of private enterprise, but for various reasons this was soon superseded either by complete State ownership or by a combination of partial ownership and financial assistance to companies operating under concessions. In no European country is there an instance of private enterprise constructing railways, amalgamating them, financing them, and generally developing them until they obtained the extent and importance of those of the United Kingdom and the United States.

France was rather slow and hesitating in adopting the new method of locomotion. The French people at the beginning of the nineteenth century were in the enjoyment of an almost perfect system of roads radiating from Paris.

Hesitation in France. Road construction had been systematically and scientifically studied at the *École des Ponts and Chaussées*. In addition the country had a serviceable system of inland waterways, both natural and artificial, which was being developed by the State on an organised plan when the railways made their appearance. France naturally hesitated to "scrap" her existing means of communication for something as yet untried and unproved, which might or might not be capable of being applied to the whole country on well arranged and comprehensive lines. Nor could she easily make up her mind as to whether she wanted private or State ownership. In 1838 the Government proposed to construct seven trunk lines, and that they should be operated by the State, but Parliament rejected the proposals, and in the

end the first considerable railway possessed by the country was projected and financed by an Englishman, Edward Blount, and constructed by another Englishman, Thomas Brassey, who employed English labour to a large extent.

The State encouraged private enterprise, but the railway industry remained in a precarious condition until 1842. M. Thiers

**M. Thiers's
Scheme.**

produced and carried a scheme under which (1) the State agreed to construct the road-bed and lease it to companies ; (2) the companies were to supply the equipment and work the railways ; (3) at the end of a specified period the whole system was to revert to the State. This, in general and subject to variations in detail, has been the underlying principle on which France has subsequently acted.

This coming of the State into partnership with private enterprise gave the latter the necessary confidence, and from 1842 to the Revolution of 1848 construction was rapid, over thirty companies being formed to construct about 2,500 miles of line. Immediately after the Revolution came a period of stagnation, but in 1851 a new era began. Napoleon III and his Government stimulated activity again by extending the concessions, or charters, to 99 years. This extension, of course, improved the financial position of the companies and enabled them to undertake the consolidations and amalgamations which produced the six companies as we now know them—the Nord, the Est, the Ouest, the Paris-Lyon-Méditerranée, the Orleans, and the Midi. The systems of these companies radiated from Paris, and each had a complete monopoly of its own district, with the result that competition was lacking, local business was neglected, and necessary branch lines were not constructed. Monopoly ultimately had its usual result—stagnation and petrification.

By 1857 the country was again faced with the problem of making railway construction keep pace with its developing requirements.

**Guarantees of
Interest.**

The difficulty was overcome by M. de Franqueville's scheme, the chief point in which was that the Government guaranteed 4 per cent. interest on the capital raised for extensions. The companies were not relieved of the obligation themselves to pay this 4 per cent., and as long as they did, they could pay what dividends they chose on their other capital. If, however, the Government was called upon for the 4 per cent.

or any part of it the dividends were restricted to former averages. A further point was that power was taken by which the Government could nationalise the railways at the end of fifteen years on terms favourable to the shareholders. In 1877 there was a movement in favour of State ownership which resulted in the taking over of unprofitable lines in the South-west which had no connection with Paris and failed to get one. Two years later M. de Freycinet produced a scheme to provide 12,000 kilometres of new lines, and it was adopted ; but it was not a well-arranged scheme, and apparently political considerations influenced its execution. Ultimately it failed, and the Ministry fell.

In 1883-4 fresh arrangements were made under the following headings :—(1) State ownership was confined to the South-west ; (2) Lines owned by the Government elsewhere were leased to the great companies ; (3) The connection of the State railways with Paris was abandoned ; (4) New construction was to be undertaken by the existing companies in their respective districts, the money being found by the State by annual credits ; (5) The State guaranteed to the companies a minimum dividend equal to an average of a series of years, and in return acquired the right to two-thirds of the profits above an agreed amount. The final development was the repurchase by the State in 1909 of the Western railway. The results of this undertaking are dealt with in the chapter on the nationalisation of railways.

It will have been gathered from this brief historical sketch that the railways have cost France considerable sums of money, and that

**Costly to
France.**

each time the State has had to intervene the companies have been able to extort still greater advantages. The State, of course, has some counterbalancing advantages, one of which is a very close control over the working of the systems, especially of their charges, which cannot be varied without the express sanction of a Ministry of State. Another advantage is the ultimate reversion of the whole national system to itself. It has been estimated that the value of the lines, exclusive of the part contributed by the State, is £640,000,000, so that, prior to the European War of 1914, it was hoped that when the concessions expired the value received by the State would be equivalent to the whole national debt.

There was no German Empire at the time of the birth of railways,

but a multiplicity of States, of which Prussia was the most important and powerful. It is difficult to picture the Germany of those days,

but the land suffered from this disunity; from
Unambitious Start in Germany. the survival of all kinds of antiquated customs, privileges and rivalries, none of which tended to progressive development. So it is not surprising to read that originally the idea of building railways was looked upon with suspicion; that they were regarded as financially and politically undesirable. The first start made in 1835 was a very unambitious one—four miles of line from Nürnberg to Fürth. Other small lines followed, and then when some idea of the possibilities of this new method of transport was demonstrated, the various States, and particularly Prussia, began to take an interest in them. Prussia began to give assistance in the shape of guarantees, or by subscribing for shares in the promoting companies. Some of the other States built their own lines; some left the initiative to private companies to which State assistance was given, though not invariably. Thus the railways of Germany began to be created in the disunited, piecemeal fashion characteristic of the whole social fabric of the land in those days. Later Prussia began to build railways herself, not merely because she conceived them to be commercially necessary, but also because they were strategically desirable to assist the maintenance of her independent nationality. Some of the lines built were in direct competition with those of private companies to which concessions had been granted.

But the really interesting and important period did not begin until Bismarck acceded to office in 1861, although for some years
Bismarck's Work. later things were allowed to develop on their own mixed lines; partly private and partly State ownership. Bismarck's idea, however, was a consistent State system for the whole of what became the German Empire, with all the private and small State managements eliminated and the whole placed under one control. This proved to be impossible of accomplishment owing to the hostility of some of the States, which had even gone to the length of acquiring their railways (when they did not already own them) to prevent them from falling under Prussian control. What Bismarck was unable to do for the Empire, however, he proceeded to do for Prussia. In 1879 he

began to buy out private companies, and in two years obtained possession of about 4,000 miles of line, and the policy was continued until the whole system became the property of the State.

But Bismarck did not entirely confine himself to the railways of Prussia. Where private companies ran into other States he acquired those portions of the lines as well, until finally Prussia became the dominating power in the German railway world. Force of circumstances such as these compelled other States to come into line as far as operation and policy are concerned, although they may have retained their ownership.

The Statistical Abstract for foreign countries shows that there were in the German Empire in 1910, 59,031 kilometres (approximately 36,658 miles) of railway, of which 55,353 kilometres (approximately 34,500 miles) were State-owned and the rest were "companies' railways,"

**Results of the
System.**

although of these privately-owned lines nearly 90 miles were worked by the State. It follows, of course, that the railways are managed by a department of the State, and the results obtained have been extolled and criticised by the supporters and the opponents respectively, of railway nationalisation. These aspects are dealt with later in the chapter on nationalisation. Here it is only necessary to say that from a purely financial point of view the German railways have been most successful. They have yielded substantial revenues to the State. From an economic point of view, also, they have been of enormous advantage to the Empire. Possession of the railways has enabled them to be used to forward national trade policy. Railway rates have been made to supplement the restrictive influence of import duties; or perhaps it would be more correct to say that the railways have been prevented from neutralising import duties by giving low rates, as might have been done had they been in the hands of private companies who arranged their rates solely from a business point of view. On the other hand, by providing exceptionally low export rates the State has been able to use them as an instrument to facilitate the growth of German trade in the markets of the world. There are defects and disadvantages, but these are more appropriately dealt with in the chapter already mentioned.

Belgian railway history is interesting because the conditions

existing at the outset approached more nearly to those of England. Both countries had arrived at what was, for the times, an advanced state of industrial development. Industrial centres were existing and were ready for the improved means of transport. There was one point of difference, however. Belgium being mostly a flat country, presented few engineering tasks, such as had to be overcome in England. Construction began in 1833, and from the first the Government had a clear idea of the necessity of taking a considerable part in the new industry. It constructed and retained for itself the great main lines of traffic, and allowed private companies to fill in the gaps, the private lines being thus more or less local in their character and serving largely as feeders for the Government trunk lines. This original work was well conceived, and well carried out ; and for about a quarter of a century the management is described as having been good. The methods of compiling reports and statistics at this time were ahead of those of the rest of the railway world. But the country seems to have become content with what had been done, and its railway methods became stereotyped and out of date. Government construction ceased in 1850, but the private companies continued to extend their systems, and presently began to amalgamate with each other until systems were created which from being feeders of, became strong competitors of, the Government system. This competition prevented railway affairs from stagnating, and there ensued a period of fierce rate wars during which rates fell to only a little over $\frac{1}{2}$ d. per ton per mile. The companies made a profit at these rates. The State was wakened from its lethargy and was forced to conduct its railway business on business lines.

Between 1870 and 1873 the State began to purchase the competing lines and to make working arrangements with those it could not acquire. By 1874 it owned half the railway mileage, and by 1880 two-thirds of it ; and there have since been further extensions of State ownership. The length of line in 1911 is returned as 4,720 kilometres (2,931 miles) of which 4,330 kilometres were worked by the State and 390 by companies. State ownership is therefore fairly complete, but once again the Belgian railway management lost its up-to-date character, and the proper functions of a railway system run on business lines were made subservient to

political considerations to the great disadvantage of the railways, with the result that in 1926 the operating of the lines was placed in the hands of a company specially formed for that purpose ; ownership still remained in the hands of the State.

There are various points of interest in the history of railways in other countries, but they must only be very briefly referred to.

State Ownership in Holland.

In Holland the task of building them up in face of the competition of the existing waterways seemed hopeless and the early railways were a serious financial drain on the resources of the Monarch (William I) and the State ; and in addition they were badly mismanaged. William II caused the uncompleted line, which was intended to run from Amsterdam to Arnheim and eventually to the German frontier, to be leased to a private company. From this sprang the Dutch-Rhenish company which did much reorganising and extending work, but remained unsuccessful until the development of the Westphalian coalfield gave it traffic. There were, at the same time, two other disconnected and unprofitable systems, but in 1860 the Government began to construct railways which were leased to an operating company. The Dutch-Rhenish Company was acquired by the State in 1890. The system remains a "mixed" one, partly State and partly company owned, but all the work of operation is done by two companies, each of which pays a rental, and, under certain conditions, a percentage of profits, to the Government.

Denmark began with privately owned railways, but the companies only provided for the populous areas where a profit seemed probable,

State Ownership in Denmark.

and so the State had to provide for the less promising areas. The companies were ultimately unsuccessful and the State had to give them financial assistance, and finally to buy them up and extend the system itself. At first the railways were worked "for the benefit of the country," but ultimately a loss occurred and rates had to be raised to put them on a profitable basis, this object being attained. Their chief success has arisen not entirely from skilful management (it is not intended to criticise the management) but from the way in which the agriculturists in Denmark have co-operated to make up large consignments of produce and thus secure the most advantageous rates. Of course, the railway companies have

also benefited from the co-operation, which gives them larger consignments to handle.

Italy suffered at the beginning of the railway era from the same disadvantage as Germany—disunity—and got as a consequence a number of disjointed systems in the various

**State Ownership
in Italy.**

States which, according to the critics, have never been satisfactorily combined now that national unity has been attained. In the course of their history the railways have been subject to various kinds of agreements with the Government—capital advances, subsidies, direct State management, and leases to companies. At one time a commission reported against State management and operation, and the lines were leased to two companies. This arrangement was ended and State control resumed; and since then it has been alleged that it has been impossible to run the railways on strict business lines because they have been made too frequently the instruments of political corruption.

PART II

RAILWAY AND CANAL ECONOMICS

I. RAILWAY ECONOMICS

CHAPTER I

RAILWAY CAPITAL

HITHERTO we have been dealing with the historical and physical features of railways; their origin, development, and practical working. It is now necessary to turn to their economic side and to obtain a broad, general view of their size and importance as business undertakings; as industries employing capital and labour, not for the purpose of production but to render most important services to mankind and (a point which is of equal importance) of earning dividends for the owners of the capital employed.

Railway Economics.

Concerning the nature of the services rendered to the community little need be said because every one is more or less familiar with them. It will, however, help the realisation of the importance of the service to recall some of the conditions and costs of transport in the pre-railway and pre-canal days. It is difficult to imagine the then isolation of communities now within easy distance of each other by rail. The only means of communication was by road and the roads were mostly indifferent or altogether bad. Stage coaches, stage wagons, and pack-horses were the only vehicles by which commercial exchanges could be effected except in the case of towns which lay along the course of rivers such as the Thames, Severn, or Trent. Smiles, in his *Lives of Engineers*, says that though "Manchester and Liverpool were improving towns," their merchandise was distributed by chapmen with pack-horses. The roads were very neglected, and in winter "altogether impracticable for wagons." "It was more difficult to reach a village 20 miles away than it is now to journey from the cotton city to London. In the inland southern counties

the only coal used was carried on the backs of horses, while the food of London was principally brought from the surrounding country in panniers. . . . It used to cost from £7 to £9 to convey a ton of merchandise from Birmingham to London." The same authority states : " In those pre-canal, pre-railway days the small quantity of Manchester goods exported was carried on horseback to Bewdley or Bridgenorth, and then floated down the Severn to Bristol." Bristol, then, was still the second city and the second seaport of England. Liverpool was a quite insignificant port.

The cost of transport in these inconvenient days was naturally heavy. E. A. Pratt, in his *History of Inland Transport*, quotes the following figures from Baine's *History of Liverpool* as prevailing in 1777—

**Cost of
Transport.**

COST OF GOODS TRANSPORT PER TON.

<i>Between—</i>		<i>By Road.</i>		
		£	s.	d.
Liverpool and Etruria		2	10	0
" " Wolverhampton		5	0	0
" " Birmingham		5	0	0
Manchester and Wolverhampton		4	13	4
" " Birmingham		4	0	0
" " Lichfield		4	0	0
" " Derby		3	0	0
" " Nottingham		4	0	0
" " Leicester		6	0	0
" " Gainsborough		3	10	0
" " Newark		5	6	8

Compare these figures with the £1 1s. 0d. per ton which was the charge for carriage of hardware between Birmingham and Liverpool prior to the rates revisions in 1920. The time occupied in the process of transporting goods has also been reduced to a few hours in comparison with days required to do the same work in the first half of the eighteenth century.

The wonderful organisation, or rather group of organisations to which we owe this remarkable transformation had a total capital at 31st December, 1925, of £1,177,417,650. This total does not agree with any figure in the summary table (A1 page 12) in the Ministry of Transport Return for 1925. That particular table is most confusing, and apparently, unreal ; and it is remarkable that the statisticians of the Board of Trade who are responsible for the production of the Statistical Abstract for the United Kingdom rejected this table when extracting the total for 1924 (the latest they have dealt with

**Railway
Capital.**

at the time of writing), and selected a figure with which that given above corresponds exactly. It is taken from the summary table on page 65, and represents the amount on which interest or dividend is payable, which, after all, is the really material thing. Parenthetically, it should not be necessary to have to put forward an explanation such as this concerning figures taken from a Government publication.

The corresponding figure in the first three editions of the book were for the United Kingdom of Great Britain and Ireland, but since the establishment of the Irish Free State the returns relate to only England and Wales and Scotland.

The realisation of this immense figure will be assisted by comparing it with the National Debt, which in 1925 stood at £7,597,848,000, and the £1,322,793,000 of national income on which Income Tax was paid in the year 1923-24. Of course, this huge capital has been of gradual growth. In 1854 it amounted to no more than £271,717,672, so that in seventy years there has been an increase of no less than 333 per cent. It is interesting to note other growths that have taken place in the same period—length of line from 7,157 miles to 20,240 miles = 182 per cent.; number of passengers from 104,295,537 to 1,232,580,914 = 1,082 per cent.; total traffic receipts from £19,341,247 to £199,652,875 = 932 per cent.; working expenses (railways solely) from £8,818,606 to £165,024,012 = 1,771 per cent.; and net receipts (including all subsidiary businesses) from £10,522,641 to £44,771,081 = 325 per cent.

This £1,177,417,650 capital is divided into six main classes as follows: Ordinary, £313,222,000; Preference, £380,437,156; Guaranteed, £144,754,587; Rent charge, £12,850,440; Debenture, £324,656,741; Loans, £1,496,726. Further, some companies subdivide their ordinary capital into preferred ordinary and deferred ordinary. The significance of these various classes of capital is largely a question of security, first of capital, and secondly of interest or dividends. In this respect there is little difference as a rule between debentures and loans. Both are more or less in the same position as mortgages of land or houses. In the jargon of the exchanges they constitute a "first charge on the undertaking and assets" of the company that issues them. In other words, if one of our railways were to fall into bankruptcy the debenture-holders would be able to seize the assets,

conduct the undertaking, and pay their own interest before considering the claims of other classes of capital holders. Guaranteed stock ranks next in importance in that before the preference or ordinary stockholders can receive any dividend the claims of those who hold guaranteed stock must be satisfied. When this is done then the preference shareholders have, as the name of their stock implies, preference over the ordinary stockholders in the division of whatever profits may remain available for distribution. Finally, the ordinary shareholders, assuming that the surplus profits are not exhausted by these prior charges, are entitled to dividend, and theirs is the only variable rate, depending for its amount on the comparative success or failure of the period to which the accounts of the company relate. The relative positions of the various classes of stock may be illustrated by the rates of interest or dividend attached to each in the balance sheet of the London, Midland and Scottish Railway company as follows: Debentures, £101,791,069, interest 4 per cent.; loans nil; guaranteed stock £40,692,916, dividend 4 per cent.; preference £118,908,762, dividend 4 per cent.; redeemable preference £8,958,145, dividend 5 per cent.; preference stock (1923) £40,133,987, dividend 4 per cent.; ordinary stock £95,202,441.

Included in the £1,177,417,650 of capital are the following amounts which have been nominally added to the various classes—

Ordinary and Preference	.	.	.	.	.	£26,606,879
Guaranteed	.	.	.	.	.	15,263,624
Rent charge	.	.	.	.	.	492,711
Debenture	.	.	.	.	.	11,625,507
Total						<u>£53,988,721</u>

Before the 1921 Act these nominal additions to capital amounted to no less than £198,000,000, which was the figure given in the first three editions of this book. When the amalgamations sanctioned by that Act took place, the companies undertook some reorganisation of their capital, with the result that the total capital of the whole undertaking which the Statistical Abstract gives as £1,282,000,000 in 1913 and £1,299,824,000 in 1921, became reduced to £1,177,417,650, the figure already given for 1925. Similarly, the nominal additions which are given as £199,344,000 in 1913 and £201,210,000 in 1921, have now been reduced to £53,988,721, as set

out above. This is a very considerable reduction, and brings the nominal additions to about 4·5 per cent. of the total. Relatively this is small. Isolated from its surroundings and taken by itself, such a total may seem rather formidable, and it may seem strange that undertakings usually esteemed as sound as British railways are, should have merely nominal additions to their capital amounting to no less than £53,988,721, additions which exist merely on paper and represent no contribution of actual capital by the stockholders. Usually such a condition of things is condemned most severely under the stringent name of "watering."

There can be no possible doubt as to the un wisdom of "watered" capital. It has been the cause of the downfall of many a joint stock or limited liability undertaking that might have enjoyed a fairly prosperous, steady career had its capital been represented by solid assets or, in default (though even this latter quality does not necessarily give immunity from failure), by solid earning capacity. The company whose capital is "watered" finds it difficult in times of bad trade to pay the usual rate of dividend; its shareholders become dissatisfied, its shares depreciate; its credit is weakened; frequently, too, the final outcome is liquidation and an insufficiency of assets to meet the demands of the owners of its

"Watering." capital. Some of the capital "watering" of British railways comes within this category in every respect except that the railways themselves are of such apparent solidity, their assets are so visible and so tangible, that failure to supply a dividend on the "watered" stock has not resulted in such widespread depreciation and distrust as to destroy credit; and moreover, the "monopolistic" position occupied by the railways has prevented that diversion of trade which inevitably follows depreciation and the destruction of confidence.

On the other hand, some of the nominal additions to capital have been quite legitimate; neither the company nor the stockholders have suffered; indeed, the company at any rate may be said to have been the ultimate gainer as the result of the policy which necessitated "watering."

**Legitimate
Additions.**

The position may be very simply explained. Prior to the European War, the tendency over a long period was for the rate of interest on really first-class, well secured capital stock, such as debenture, to fall. The war put up interest rates, but for the purpose of the

illustration this reversal of a former tendency may be ignored. Assume, for the sake of an easy illustration, that one of the railway companies years ago issued 6 per cent. debentures. Whatever may have been the case years ago, 6 per cent. became for many years a very high rate of interest for a first-class debenture secured on so important an undertaking as a railway. Naturally the directors of a company having debentures carrying such a rate of interest would want to bring their stock into conformity with modern conditions. They would no longer desire to borrow money at 6 per cent. Their idea, probably, is that under all the circumstances 4 per cent. is quite sufficiently high and they would seek to reduce the rate of interest accordingly.

But the man who has invested £100 in these particular debentures has an inalienable right to his covenanted 6 per cent. ; and that right can only be disturbed by paying him out or by compensating him for disturbance. To pay him out would be an undertaking not to be lightly faced.

**Cause of
Some Additions.**

In the first place, it is probable that the market value of his £100 will have risen to £150, or even more ; but this figure best serves to illustrate the point. This comes about because, on the assumption that the prevailing value of money lent on debentures is 4 per cent., then the more recent investor seeking employment for his surplus wealth is willing to pay £150 for a debenture of £100 yielding 6 per cent. Such a payment will give him exactly 4 per cent. The railway directors who desire to reduce the rate of interest on their debentures from 6 per cent. to 4 per cent. are therefore faced with the alternative of either buying out the 6 per cent. debenture-holder at the rate of £150 for every £100 of stock he holds, or of putting him in a position which shall be no worse than that he now occupies. Whichever course is adopted the ultimate result is the same. If the directors choose the latter alternative they must continue to give the debenture-holder the equivalent of his 6 per cent., and to do this they must give him in exchange for every £100 of stock at 6 per cent. £150 of stock at 4 per cent. If they do this the stock is immediately watered to the extent of 50 per cent. The directors are not called upon to find an extra penny for payment of the interest on the debentures issued up to that time and in all subsequent issues they borrow at 4 per cent. and thus save 2 per cent. In the long run probably the company may be better

off, although the original amount of debentures has been increased 50 per cent. ; while the original debenture-holder remains in enjoyment of precisely his original income. Thus "watering," a practice so liable to abuse and disaster, may be a harmless, and even a beneficial transaction.

The case of the old Midland Railway Company may be taken as an example. The company no longer exists as a separate entity, and, of course, the figures which follow no longer have any application to existing circumstances. but they will still serve as an illustration. In-

**The Old
Midland Railway
Company.**

cluded in the old company's capital were the following nominal additions :—Ordinary, £34,664,741 ; preferential, £19,765,891 ; guaranteed, £7,588,166 ; debentures, £11,769,422. In round figures these nominal additions amounted to £73,790,000, and it was somewhat staggering to realise that of a total capital of £203,722,000 so large a proportion (over 36 per cent.) was "water." Originally the debenture stock carried a 4 per cent. rate. A reduction was made in two stages, first from 4 to 3 and second from 3 to 2½. In addition there were various rent charges, preferential and guaranteed stocks, bearing differing rates of interest, which were all consolidated into one kind of stock at a lower rate of interest. As has been seen, the nominal rate of interest on a stock cannot be reduced unless the holders are compensated, and, doubtless, these reductions were both economical and expedient, nor did the company suffer from the nominal additions to capital which they entailed.

Whether the same "clean bill" could be given concerning the alteration of the ordinary stock was a matter of opinion. What

**Alterations
of Stock.**

happened was this. For each £100 of ordinary stock held at the time of the conversion the directors issued £100 of preferred converted ordinary stock, bearing interest limited to the low rate of 2½ per cent., and £100 of deferred converted ordinary stock, which had no fixed rate of dividend but was entitled to take all the profits that remained to be divided after all the other stocks had received their fixed rate of interest or dividend. It might thus happen that in a lean year there was nothing left, after all the prior claims had been satisfied, to pay a dividend on the deferred ordinary stock ; or it might happen that, as in 1912, while the preferred ordinary received its 2½ per cent. the deferred ordinary received 3 per cent. From the point of view of the

ordinary stockholder who retained his original holding as modified by the conversion the change meant that on the original value of his holding, say £100, he was assured of $2\frac{1}{2}$ per cent., while on the nominal, or bonus, £100 he stood to gain a higher rate of interest, or a lower, as the experience of the company varied in any particular year. In the end he was no worse off. If the profits before division would have given him 5 per cent. he would receive $2\frac{1}{2}$ per cent. on each of his £100 of preferred and deferred stocks. If the profits were only sufficient to pay $2\frac{1}{2}$ per cent. on the original value of his stock then he would receive exactly that amount— $2\frac{1}{2}$ per cent. on his preferred ordinary stock. Similarly, from the point of view of the company, it made no difference to the total amount paid whether that total was paid as 5 per cent. on the original amount or $2\frac{1}{2}$ per cent. each on two separate hundreds. If the profits justified $2\frac{1}{2}$ per cent. only, then only $2\frac{1}{2}$ per cent. was paid on the preferred ordinary stock, which it will be remembered was really, in effect, the original ordinary stock.

And so we have a perfect illustration of the position that, apart from the inherent objection to giving something for nothing in the shape of a 100 per cent. bonus on ordinary capital,

Conversion and Nominal Additions. neither the company nor the shareholder can be said to have suffered any disadvantage. Sometimes quite a useful purpose may have been served by these conversions entailing nominal additions; at any rate, that was the argument advanced in their favour to induce Parliament to sanction them. In other cases it is probable that the "watering" deserves sterner criticism.

The wisdom or otherwise of these nominal additions to capital may be criticised from another point of view, its effect on the dividends paid. Set out below are the actual rates paid on the various classes of capital in 1912 side by side with the Board of Trade calculation of what the dividends could have been had there been no nominal additions to capital.

<i>Class of Capital.</i>	<i>Dividend actually paid.</i>	<i>What it might have been.</i>
	%	%
Ordinary	3.45	4.25
Preferential	3.52	4.01
Guaranteed	4.02	4.65
Loans	3.61	3.61
Debentures	3.42	3.92
All classes	3.52	4.13

In no case is the difference great, for, taking all classes together, it will be seen that had the companies been able to refrain from making these additions the amount of money distributed was sufficient to make the average rate 0·71 per cent. higher. The increase in the rate per cent., however, would have been the only difference; the total amount distributed would have been the same.

The above paragraph has been allowed to remain in the present edition, although now out of date, because the statistics as now published by the Ministry of Transport do not enable an exactly similar tabulation to be made, and because it is an interesting statement of things as they were. Obviously, however, the present comparison must be different owing to the large reduction in the nominal additions to capital. The figures which can now be tabulated are—

Average rate of interest and dividend for all the companies in 1925 on—

(1) Nominal capital	4·19 per cent.
(2) Issued "	4·40 ..
(3) Receipts from capital issued	4·28 ..

For the four big companies the figures in the same order and under the same headings are—

Southern—(1) 4·19 per cent. ; (2) 4·30 ; (3) 4·35.

Great Western—(1) 5·23 ; (2) 5·03 ; (3) 4·62.

London, Midland and Scottish—(1) 4·50 ; (2) 4·48 ; (3) 4·32.

London and North Eastern—(1) 3·66 ; (2) 4·26 ; (3) 4·16.

Some explanation of the terms employed is required to make the above figures understandable. "Nominal capital" includes the nominal additions to capital in respect of which no money has been received; "Issued capital" is the total minus such additions, and "Receipts from capital" issued includes relatively small sums which have come from other sources.

From the point of view of the trading and travelling public "watering" of stocks may be criticised on the ground that it has resulted in a large increase in the capital on which dividends are expected to be paid, and that as the

Effect of Watering Stock.

capital, whether nominal or otherwise, exists, there must necessarily be a constant effort on the part of the directors to provide it with a reasonable rate of interest. This means the maintenance of profits and, it may reasonably be argued, constitutes an obstacle to the reduction of rates and fares which the

public are incessantly demanding. Again, "watering" lends itself very readily to the criticisms of the Labour Party and to all the other advocates of the policy of nationalising railways.

What is this total capital of £1,177,417,650 represented by? Freehold land, track, buildings of all kinds, rolling stock, harbours

How Capital is Represented.

and docks, steamships, hotels, and the thousand and one miscellaneous small things in the way of stores and equipment which go to make up a modern railway. It is represented by 20,390 miles of line—this, however, is not a really representative figure, for it takes no notice of double tracks, etc. Of running track reduced to figures of single line there are 37,018 miles, and with sidings included 52,232 miles—24,159 steam locomotives; 50,823 passenger carrying vehicles; 721,359 merchandise and mineral vehicles, and 53,138 railway service vehicles.

These are very interesting figures, but the full count of what the capital represents is best given in values. The annual return of the Ministry of Transport gives the following particulars of capital expenditure on the railways for 1925—

Lines open for traffic	£861,856,964
Lines not open for traffic	4,924,169
Lines leased	126,894
Lines jointly owned	11,618,042
Lines jointly leased	118,727
Rolling stock	150,670,702
Manufacturing works and repairing plant—	
Land and buildings	13,948,395
Plant and machinery	8,071,551
Total (Railways proper)	£1,051,335,444
Horses	40,592
Road vehicles (goods and passengers)	1,109,490
Steamboats	9,298,145
Marine shops and plant	245,838
Canals	8,143,690
Docks, harbours, and wharves	57,307,162
Hotels	9,095,599
Electric power stations, etc.	7,074,240
Land, property, etc., not forming part of the railway or stations—	
Used in connection with railway working	3,024,314
Not used in connection with railway working	39,790,644
Other industries	94,727
Subscriptions—To Irish railway companies	1,326,673
To companies other than railway companies	1,204,650
Special items	356,119
Expenditure not allocated (mainly railways)	9,190,059
Total capital expenditure	£1,198,637,386

Two very interesting facts arise from this table. First, there is the division of capital expenditure between the railways proper and the subsidiary undertakings, and secondly, it is interesting to find how much money in excess of the capital raised has been put into the undertakings as a whole. If the figures given above are to be accepted as a valuation, then obviously the industry is worth very much more in capital value than the amount which has been raised as capital including all the nominal additions. It has come, of course, from appropriations from revenue, and it goes a long way towards counterbalancing the £53,988,721 of nominal additions to capital to which reference has been made. In short, the "watering" of capital is not nearly as serious a matter as might appear on the surface. Most limited, or public, companies regard it as perfectly legitimate to issue bonus shares to the shareholders when the regular appropriation of reserves, which are used in the business, has led to the building up of solid tangible assets well in excess of the nominal amount of capital represented by shares and debentures; and no one thinks of criticising such bonus additions which represent the distribution of reserves accumulated out of the profits of the company, or additions made to its buildings or plant out of annual revenue.

This huge capital, of course, has been of very gradual growth, and each year sees its amount increased. It began to accumulate long before there was a single mile of rail or a single locomotive or vehicle of any kind in existence.

Growth of Capital. Before any of these things came the preliminary surveys of the country proposed to be covered. Then the engineers having drawn up their scheme it became necessary to apply for Parliamentary sanction before its execution could be carried out. Parliamentary approval is a necessary but very expensive preliminary. It might be imagined that a company applying to Parliament for permission to construct a railway from which a large tract of territory would benefit, would be received with open arms. In the abstract, no doubt, it is welcomed, but when the scheme gets to the Parliamentary committee to whom the duty of investigating is committed, then begins the clash of individual interests. Every person affected, for instance a landowner, part of whose land is required, enters his objection, not because he has an insuperable objection to parting with his property, but because,

as a matter of tactics, he knows that if he is to obtain the best possible terms and conditions he must fight for them. His sale is not a willing one, but a compulsory one, and he must be compensated for the compulsion employed and for the depreciation which, he claims, his land will suffer through having a railway taken across it. These fights before Parliamentary committees date from the very beginning of railway enterprise. Was it not George Stephenson who, when before a Parliamentary committee, was asked what would happen if a cow strayed on to a railway line, and replied that it would be "bad for the cow"? The incident, whether true or not, is sufficiently good to illustrate the attitude which Parliament has always adopted towards these schemes. Every interest, no matter how small, must be protected if they were to be sanctioned. No wonder then that the necessity of acquiring Parliamentary sanction is an expensive one. How much it has cost no one can say, but preliminary expenses, which of course include Parliamentary sanction, have been estimated by a competent authority at £4,000 per mile. Obviously from first to last it has added millions to the capital of the companies.

After sanction is obtained the engineers make their second survey to draw out their more detailed working plans; and then comes the work of construction. Neither of these advanced stages is inexpensive. In new and sparsely populated countries, such as the United States in the days of railway development, surveys and construction are much more simple matters. The railways and the population advance almost side by side, and the method of construction followed as a rule would be regarded in this country as extremely primitive. It has its advantages and disadvantages—cost of construction is relatively light, but as this generally implies lack of the stability usually regarded as essential in this country, the work of construction has practically to be done over again as the surrounding population increases and finds more and more work for the railway to do. Still, in the end, the cost of construction in these new countries is usually lower than here. In the United Kingdom, of course, we are familiar with virtual reconstructions. There is not an important railway company that has not had to duplicate its line in places, to rebuild its large terminal stations, to increase its siding accommodation by providing immense goods yards, to rebuild its warehouses for

How Capital is Swollen.

the accommodation of merchandise and to construct "short cuts" for the purpose of reducing its original mileage from point to point. But this is not reconstruction in the sense implied above. British railways have had to do very little of this sort of reconstruction because, for one thing, of the watchful eye which Parliament, through the Board of Trade, kept on them. Parliament has wisely insisted on a certain standard being maintained in this constructional work ; track must be well laid ; bridges well constructed ; and even the rolling stock is subject to regulation, though, as a matter of fact, the railway companies claim that in this respect they are usually in advance of Parliamentary requirements. All this, of course, has added to the cost of construction and has helped to swell the capital accounts of the railway companies to their present proportions.

CHAPTER II

RAILWAY REVENUE AND EXPENDITURE

REVENUE

THE gross receipts of the railways of the United Kingdom in 1925 amounted to £217,744,361. By itself this is an impressive figure, but it requires to be reduced to its true proportions by means of comparisons. The total capital, we have seen, is £1,177,417,650 ; gross earnings therefore amount to 18·49 per cent. of the total capital. The net receipts for the same year were £44,771,081, and this amount is equal to 3·8 per cent. of the total capital. Both percentages, but especially the latter, seem astonishingly small. It may be suggested that they are so because the figures apply to the whole of the companies of the United Kingdom ; the large and the small, the profitable and the unprofitable, the efficient and the inefficient. That is true, of course, but even so the figures do not appear to be really misleading when tested by the returns of the four big companies. The total net income on the capital actually in the business is : Southern, 4·30 per cent. ; Great Western, 4·22 per cent. ; London, Midland and Scottish, 4·26 per cent. ; London and North Eastern, 3·1 per cent. On the nominal capital of the companies the figures are : Southern, 4·14 per cent. ; Great Western, 4·7 per cent. ; London, Midland and Scottish, 4·4 per cent. ; London and North Eastern, 2·7 per cent. The figures will be better appreciated when it is explained that the nominal capital of the Southern and the London and North Eastern companies includes some nominal additions (what we have previously called “ water ”) while that of the Great Western and London, Midland and Scottish is actually less than the capital actually in the business because both companies are in the fortunate position of having in their businesses considerable balances of premiums in addition to their nominal share and loan capital. On the whole, the percentage given for the whole country cannot be said to be unrepresentative to any serious extent of individual experience. The percentage of gross earnings to capital indicates that it takes the companies more than five years to turn over their

capital, which, general knowledge suggests, is a very much longer period than that occupied by the average industrial concern. It is impossible, of course, to get at the gross receipts of manufacturing companies, but in these days of limited liability concerns it is quite possible to compare their net profits with their capital. For this purpose ten companies have been selected. Together they have a capital of £68,482,898, and their net earnings for their trading years ending in 1925 (all their years did not end at the same time) come to £9,965,237, which is equal to 14·55 per cent. It cannot be too strongly insisted upon that this is net profit, and that in the case of some of the companies it is a net profit after a large reserve has been made for depreciation. Taken individually, the net profit of the same companies ranges from 5·37 per cent. to 22 per cent. The fact that there is this disparity between the net receipts of the British railways and of those of industrial companies seems to point to one of three things. Either the railways are (1) over capitalised ; (2) badly and extravagantly managed, or (3) extremely efficient and rendering very cheap services to the public. These points are worth examination in some detail—

(1) Over capitalisation. It seems obvious, in view of what has been said already as to the cost of construction, that there is some degree, either small or great, of over capitalisation.

Over Capitalisation.

And apart from the initial expense of construction and equipment there is reason to believe that

capital accounts have been unduly swollen in comparison with what is the general business custom. In the average business, one of the things most suspiciously regarded and carefully guarded against is the increase of capital account. Of course there are plenty of cases in which capital has been increased. Growth of business involves larger works, extensions of plant, increases of stocks of raw materials and finished goods. Such experiences are quite common, but it is still more frequent to find that commercial and manufacturing concerns contrive to avoid additions to their nominal capital by providing for normal extensions out of reserves. It is the usual thing for companies to set aside annually large sums for reserves, and these reserves in nine cases out of ten are "employed in the business." The meaning of this is that profits are not distributed "up to the hilt" but some portion is kept in hand as a reserve fund. This fund is mostly used to replace obsolete plant,

to extend premises, or to increase stocks of raw and finished materials. Generally it helps to finance the business just as much as if it were subscribed capital. It is not often a definitely earmarked sum lodged at the bank or invested, because used in the business its earning powers are so much greater. It is an intangible balance sheet figure on the liabilities side which is balanced by increased value of assets on the other side. No single asset reveals the presence of this reserve fund; it is spread over all of them. And the amount of nominal or paid up capital for which the directors are responsible to the shareholders remains unaltered.

Such reserves are not unknown in connection with the railway companies but they are relatively insignificant. In 1925 the depreciation funds of the four big companies equalled less than 7 per cent. of their capital, and their reserve funds less than 2 per cent. It will be realised, when expenditure comes to be considered, that it is the custom of the companies to provide for extensive repairs, renewals, and replacement of permanent way, rolling stock, and plant generally, and also for minor extensions, out of the annual revenue; but still experience shows that they have been too prone to borrow fresh capital for extensions while the ordinary limited liability companies contrive to provide for much more of their growth out of reserve funds. In recent years the companies have exercised more restraint under the compulsion exercised by the expressed opinions of their critics, many of whom have been shareholders, but previously their attitude in this matter was very well summed up in a remark made by Sir Richard Moon, a former chairman of the old London and North Western Railway Company, who once said: "If the capital account were closed the company would never pay another dividend."

There is much truth in the remark. Possessing insignificant depreciation and reserve funds, the companies, if they closed capital accounts, would be unable to undertake necessary developments on a large scale. They would have to carry on their work with the existing facilities, and failure to keep pace with growing requirements would soon mean congestion, delay, loss of traffic and diminished earning power. Alternatively developments would have to proceed more slowly and be paid for out of earnings;

and as the margin of these beyond expenditure is so small relatively, dividends would be endangered, if they did not disappear. Sir Richard Moon's remark, therefore, is not to be accepted as an inviolable principle of railway economics, but rather as the outcome of a policy which some persons would not hesitate to call short-sighted and foolish, but one which now cannot be appreciably or rapidly altered without the unfortunate results which he foretold. But while there is some truth in the remark there is also some exaggeration, for in recent years capital additions have been restricted to the fullest possible extent.

(2) Bad or extravagant management. Whatever may be the case now, there seems to be no question that not much longer than two decades or so ago such a charge was amply justified.

**Bad or
Extravagant
Management.**

In the passenger service there was such excessive duplication and competition, and, in the goods branch, trains, trucks and loads were so small, and mileage so great that there arose a considerable outcry from shareholders. At first these complaints were met with the reply that the character of business in this country was such that large trucks fully loaded made up into large trains (which would have meant a decrease in working expenses) were impossible; but the agitators persisted and forced their point. Possibly there is still room for improvement in this respect, but that something valuable resulted is seen from the Board of Trade Bluebook statement of total receipts per train mile. In 1903 (the first year dealt with in this particular section of the returns for 1912), the passenger receipts averaged 49·21d. per train mile, and in 1912 50·26d., an increase of 1·05d. —not a large one it is true, but the movement is in the right direction. The corresponding figures for goods are 82·55d. and 101·14d., an increase of 18·59d. per train mile. Taking the two services together the figures are 62·79d. and 68·83d., an increase of 6·04d. per train mile. What this means in the case of goods traffic may be seen from the fact that the goods train mileage in 1912 was 151,892,869, and the increased earning 1s. 6½d. per train mile. The change is also illustrated by the fact that in 1903 the goods train mileage was 159,743,146 miles, which is 7,850,277 miles more than the figure just given for 1912. Obviously it is impossible to resist the conclusion that management was bad even if it is not now.

The preceding figures are out of date, of course, but they are allowed to stand because it does not appear possible to give the corresponding figures for the present time. They may be in the return issued by the Ministry of Transport, but careful search has failed to find them. Instead of train mile figures for the whole country, the return gives those for each of the four big companies. They are as follows—

AVERAGE RECEIPTS PER PASSENGER AND PER GOODS TRAIN MILE			
	1913	1924	1925
	<i>s. d.</i>	<i>s. d.</i>	<i>s. d.</i>
SOUTHERN RAILWAY—			
Passenger traffic	4 10	8 2	7 9
Goods traffic	8 10	16 9	16 8
GREAT WESTERN RAILWAY—			
Passenger traffic	4 5	7 4	7 3
Goods traffic	7 9	13 10	13 9
LONDON, MIDLAND AND SCOTTISH RAILWAY—			
Passenger traffic	4 4	7 6	7 4
Goods traffic	8 5	14 11	14 9
LONDON AND NORTH EASTERN RAILWAY—			
Passenger traffic	4 2	7 7	7 2
Goods traffic	8 4	15 0	14 11

On the surface, these figures may seem to suggest to anyone unfamiliar with the events of the last few years that there has been an enormous increase of efficiency and earning power, but as will be seen in later chapters, allowance has to be made for substantial increases in fares and freight rates, which have been permitted since 1913, and so the comparison is vitiated and no longer serves as a guide to the improvement, or otherwise, in railway management. Unfortunately, such a comparison cannot now be made as it could thirteen years ago when the companies were working on their old fixed rates. From general observation and experience, one would say that the improvement visible in 1913 is not more than maintained; that apart from special circumstances such as the permitted increase in charges probably the improvement has not been more than maintained; but for a definite answer to the question, it will be necessary to wait until Ministry of Transport figures cover several more years.

(3) That from the point of view of the services rendered to the public the railways are extremely efficient. This latter point need not be laboured. Every one is familiar with the character of the services rendered to the travelling public. During the railway era

the cost of transport both of individuals and of goods and merchandise has been immensely reduced, and at the same time the service has been improved. To realise this one has only to recall the miserable open carriages, not much better than modern cattle-trucks, originally provided for travellers, and contrast them with the present corridor coach or dining car.

**Efficiency of
Railways.**

The result of the examination seems to be that the extremely small percentage of gross and net earnings to the capital employed is due to a combination of all these three causes.

The survey of the revenue of the companies may be completed by setting out the details of the various sources of income in 1925

**Various Sources
of Income.**

as follows: From passenger train traffic (including mails and parcels) £94,078,915; from goods traffic, £103,676,384; from joint lines, £1,897,576; from road vehicles, £207,340; from steamboats, £4,312,313; from canals, £188,000; from docks, harbours, and wharves, £6,867,551; from hotels, dining cars, etc., £6,450,651; from other businesses, £65,631—total, £217,744,361. It will be seen that the largest portion of the income is derived from goods traffic, and this feature has been constant throughout the returns since 1870. In 1925 the revenue from passenger traffic amounted to 43·21 per cent. of the total receipts; from goods traffic to 47·61 per cent., and from other sources to 9·18 per cent.

EXPENDITURE

There are, of course, two kinds of expenditure, capital or permanent, and working or recurring. The extent and growth of capital expenditure has already been dealt with. Working

**Working
Expenditure
of Railways.**

expenditure for 1925 amounted to £181,008,514, which was equal to 83·12 per cent. of the total receipts. When the first edition of this volume appeared the figures corresponding to those above were for 1912, and they were working expenses £81,224,343, which was equal to 63 per cent of the total receipts. Attention was then called to the steady growth in the annual total of working expenses, and to what was the really significant thing—the constant growth in the proportion of working expenditure to total receipts, and the corresponding diminution in the proportion of net receipts to the total of paid up

capital. The point was illustrated by a tabulation under both headings. Unfortunately, this table cannot be brought up to date, because the figures included the railways of Great Britain and Ireland. Since those days the Irish Free State has been created, and as a consequence the figures for the Irish railways are no longer included in the Ministry of Transport return. The table is so interesting, however, that it is worth while retaining. It is as follows—

	<i>Working Expenditure.</i>	<i>Proportion to Total Receipts.</i>	<i>Net Receipts.</i>	<i>Proportion to Total Paid-up Capital.</i>
	£	%	£	%
1870	21,715,000	48	23,362,000	4.41
1875	33,220,000	54	28,016,000	4.45
1880	33,601,000	51	31,890,000	4.38
1885	36,787,000	53	32,767,000	4.02
1890	43,188,000	54	36,760,000	4.10
1895	47,876,000	56	38,046,000	3.80
1900	64,743,000	62	40,058,000	3.41
1905	70,064,000	62	43,466,000	3.42
1910	76,569,000	62	47,355,000	3.59
1911	78,617,000	62	48,581,000	3.67
1912	81,224,000	63	47,329,000	3.55

In the period of over forty years thus briefly reviewed, the proportion of working expenditure to total receipts increased no less than 15 per cent. It looked like a condition akin to what, in economics, is known as the “law of diminishing returns.” The railway companies had been putting into their undertakings more and more capital, and had been accomplishing more and more work without obtaining a proportionately increased return for their greater activity, and the greater facilities provided for carrying on their undertakings. This condition of things did not escape the attention of shareholders and others interested. It was a fairly constant source of comment at meetings of the companies during the previous ten years; and apparently with good effect; for, with the exception of occasional fluctuations in intervening years, not shown in the brief table above, the rate of increase was at least checked.

Since the above table was compiled, however, there have been some very remarkable alterations in the expenditure for the United Kingdom of Great Britain to which the following figures relate solely, Ireland being omitted.

**Remarkable
Growth of
Expenditure.**

	<i>Working Expenditure.</i>	<i>Proportion to Gross receipts.</i>	<i>Net Receipts.</i>	<i>Proportion to Total capital.</i>
	£	%	£	%
1913	83,754,823	64·49	46,113,893	3·59
1921	246,156,337	104·16	—	—
1922	191,074,945	80·2	47,148,809	3·67
1923	181,528,648	80·87	42,914,500	3·71
1924	182,925,541	82·42	39,004,200	3·35
1925	181,008,514	83·12	36,735,847	3·12

While this table is not strictly comparable with the old one which immediately precedes it because of the omission of the information with reference to the Irish railways, probably the omission does not seriously affect the results, and if the facts are remembered there is much that is interesting in the two tables. Probably the most striking thing which calls for prompt explanation is the fact that in 1921 working expenses were actually more than receipts, and that on the surface there was a deficit of £9,844,662 on the year's working. Two things combined to bring about this result: (1) the fact that the railways were still in the hands of the Government, and (2) the extraordinary increases in working expenses that had taken place during the war years and subsequently. As to Government control, all that need be said here is that the railways remained in the possession of the Government until midnight on 15th August, 1921, and that the Government paid £51,339,393 in that year as compensation to the companies.

As to the second cause, it is not exaggeration to call the increases in working expenses staggering. The whole of the increases cannot be shown in detail, but the few which follow are very illuminating—

**Staggering
Figures for 1921.**

	1913	1921
	£	£
Cost of loco. coal	8,509,005	22,997,195
Maintenance and renewal of way and works—		
Salaries and wages	3,896,074	12,018,367
Maintenance and renewal of rolling stock—		
Salaries and wages	4,865,481	15,390,129
Loco. running expenses—		
Salaries and wages	6,922,435	23,215,120
Traffic expenses—		
Salaries and wages	16,473,186	48,890,446

In these five items alone the increase in round figures is from 40 millions in 1913 to 122 millions in 1921, or just over 201 per cent., and on top of this there is the further fact that (owing possibly

in large measure to a coal strike which lasted from 1st April to 2nd July, 1921) traffic must have fallen off enormously, because the total number of engine miles run in passenger and freight traffic was 315 millions, whereas in 1913 it was 416 millions. Again the quantity of coal carried fell from 225 million tons in 1913, and 181 million tons in 1920, to 128 million tons in 1921. Since this latter year the tonnages of coal carried have been—1922, 200 millions; 1923, 222 millions, 1924, 209 millions, and 1925, 193 millions.

**Causes of
the Increase.**

Obviously the 1921 figures were abnormal. That year was the culminating point of the post war inflation, and most things which the railways buy, including labour, were at an unprecedented level. The reaction came in the same year. It had already begun when the 1921 coal strike added the final condition necessary to produce a distinct and permanent movement towards deflation. In industrial and commercial concerns the fall was sharp, and as far as actual totals are concerned there has since been a very considerable fall in the cost of operating the railways, but in spite of this the figures given above reveal a very significant increase in the proportion of expenditure to gross receipts. Whereas in the pre-war period the biggest percentage was 63, in the last four years it has never fallen below 80. In the earlier editions of this book occurs the sentence, "Notwithstanding the best intentions and the greatest determination, it is not always possible to reduce working expenses." The figures are an extraordinary commentary on this remark. In 1913 the necessity for economy was fully recognised by all engaged in railway operation, and there was evidence of successful efforts in that direction even if the results achieved were small, but since then circumstances have been too strong for the companies, and they have been swept along in the deep current which has carried the whole industry and commerce of the nation in the same direction.

Brief reference should be made to the proportion of net receipts to the total capital, in order to explain that in consequence of the

**The Fall in
net Receipts.**

amalgamations sanctioned by the 1921 Act, there have been appreciable reductions in capital. In 1921, before the re-arrangements had taken effect, the capital is given as £1,299,824,000, and in 1925 as has been seen £1,177,417,650. The effect of this has not been tested, but from the figures it is certain that it has had some influence in steadying the proportion

of net receipts to capital. Calculated on the 1921 capital figure the proportion must necessarily be smaller. The net result is that since the war the companies have found it extraordinarily difficult to earn a return commensurate with their capital, and, as will be seen later, if they had not been permitted to make large increases in their charges for passenger and freight traffic it would have been impossible to resist virtual, if not actual, bankruptcy with reconstruction and drastic cutting down of capital. The bankruptcy of such an important thing as the transport system of a nation, however, is unthinkable. The increased charges had to be sanctioned to save the situation.

The railway companies have always been under an obligation imposed by Parliament, not only to publish the gross amount of their expenditure, but also to analyse it in some detail. For some years, however, students and critics of railway affairs complained that the returns required were altogether inadequate and

**Operating and
"Overhead"
Costs.**

out of date ; that the headings prescribed mixed up the expenditure incurred in the different branches of the work. They asked for a more careful analysis of the figures under headings that would distinguish the exact total cost of maintenance from that of working the railways. In other words, they desired to get figures which would correspond to those that in an ordinary business show (1) actual works costs, and (2) "overhead," or "dead," expenses, or "on costs" as they are variously called. Their demand for more detailed and carefully analysed information was based on the argument that much railway expenditure is continuous, and varies surprisingly little irrespective of the volume of traffic handled ; that in fact the great bulk of the expenditure goes on whether the traffic to pay for it comes or not.¹ As will be seen there is much in the contention, but it can easily be pushed too far. It is obvious, for instance, that expenditure, whether directly attributable to traffic or not, cannot go on indefinitely if the traffic is not forthcoming to pay for it. The ultimate end of a policy which paid so little attention to the balance of income or expenditure would be bankruptcy. It might be pursued for a time, but no sane board of directors, nor the keen business men who usually are to be found amongst railway shareholders, would tolerate its long continuance.

¹ The late Sir Wm. M. Acworth.

But, on the other hand, the volume of traffic might conceivably be largely increased without much, if any, increase occurring under some of the expenditure headings. The agitation was successful, and now the Ministry of Transport publishes annual returns, which, though rather confusing and mystifying in some respects (particularly as regards capital), do meet these requirements very fully.

In the first place the returns now give us what may be called a "bird's-eye view" of the expenditure, and then each separate item is taken and analysed in great detail. For the purpose of the argument the detailed analysis is the more important, but it is interesting and useful to get also the "bird's-eye view" which is as follows—

EXPENDITURE OF THE RAILWAYS AND ANCILLARY BUSINESSES
(in thousands, 000 omitted)

	1922	1923	1924	1925
Railway	£174,844	£165,978	£166,882	£165,024
Passenger road vehicles	154	174	186	230
Goods motor vehicles	24	—	—	—
Steamboats	3,881	3,767	3,962	3,938
Canals	389	332	317	299
Docks, harbours and wharves	6,103	5,911	6,140	6,048
Hotels, etc.	5,628	5,296	5,368	5,409
Other businesses	73	68	67	58
Total expenditure	<u>191,074</u>	<u>181,528</u>	<u>182,925</u>	<u>181,008</u>

The exact totals for each of the four years have been £191,074,945 ; £181,528,648 ; £182,925, and £181,008,514. For the purpose of the argument that the great bulk of the expenditure goes on whether the traffic to pay for it comes or not, it is only necessary to take the details of the figures which appear under the heading "Railway." These are shown as follows—

EXPENDITURE IN RESPECT OF RAILWAY WORKING
(in thousands, 000 omitted)

	1922	1923	1924	1925
	£	£	£	£
Maintenance and renewal of way and works	28,538	24,990	24,375	23,993
Maintenance and renewal of rolling stock—				
(1) Locomotives	14,987	12,652	13,260	13,412
(2) Carriages	8,091	7,945	7,825	7,551
(3) Wagons	9,131	8,080	7,404	7,184
Carried forward	<u>60,747</u>	<u>53,667</u>	<u>52,864</u>	<u>52,140</u>

EXPENDITURE IN RESPECT OF RAILWAY WORKING—(contd.)

	1922	1923	1924	1925
	£	£	£	£
Brought forward	60,747	53,667	52,864	52,140
Loco. running expenses	40,064	40,815	41,871	40,907
General charges	5,989	5,687	5,820	5,854
Law charges	339	260	239	230
Parliamentary expenses	46	36	50	40
Expenses of Amalgamation and rates tribunals	—	60	19	14
Compensation (Accidents and losses)—				
Passengers	73	80	79	61
Workmen	379	437	425	397
Goods, etc.	591	617	657	701
Rates	8,355	7,881	7,654	7,624
Taxes	12	8	9	7
Tithe rent charges	35	27	26	27
Government duty	477	443	421	419
National Insurances—				
Health	633	659	629	622
Unemployment	503	523	478	459
Running powers (balance)	39	28 Cr.	1 Cr.	30
Mileage demurrage, etc.	79	83	98	78
Joint lines	11	31	32	30
Miscellaneous	344	310	282	258
Total expenditure	<u>174,844</u>	<u>165,978</u>	<u>166,882</u>	<u>165,024</u>

The exact totals for each year are: 1922, £174,844,342; 1923, £165,978,844; 1924, £166,882,592; 1925, £165,024,012. This table, it will be seen, gives us details of the expenditure (in 1925, for instance) of 165 millions out of 181 millions, and they are the facts which really matter, not only because they embrace the great bulk of the expenditure, but because they all relate to the working of the railways proper as distinct from the subsidiary or ancillary businesses. One of the most remarkable features of the figures is their singular constancy. Considering their magnitude there is astonishingly little variation in them. To bring the argument still further home the table may be compressed and re-arranged as follows—

	1924	1925
Locomotive running expenses	£41,871,326	£40,907,653
Traffic expenses	55,219,133	55,175,473
Maintenance of rolling stock	28,490,366	28,148,339
Maintenance of way and works	24,375,912	23,993,962
All other expenses	16,925,855	16,798,585

We are now in a position to get at what in an ordinary business would be called (1) manufacturing costs, and (2) overheads.

Probably there will be very little criticism if we include under (1) locomotive running expenses and traffic expenses, for 1925 together £96,083,126, and all the rest, £68,940,886, under (2). If this division is accepted as reasonable, it will be seen that overheads amount to 71·75 per cent. of the manufacturing costs. As to whether this is an unusual proportion experience will vary, of course, with the particular business under examination. Possibly it would be regarded as heavy for some, but, on the other hand, there are others where such a relationship would not be regarded as abnormal. When it comes to a question of continuity of expenses whatever the volume of traffic, it is difficult to know quite how far to go with the theorists. Certainly locomotive running expenses should vary with the volume of traffic, and so should maintenance, but there seems to be less room for fluctuations in traffic expenses, because this heading covers a very considerable staff of men engaged in superintendence—the stationmasters, clerks, porters, signalmen, guards, etc. Taking a short view, of course, there may be large variations in traffic without affecting appreciably the expense under any of these headings, but in the long run volume of traffic must materially influence the expenditure under most of the headings. A permanent shrinkage in revenue must, sooner or later, lead to curtailment of expenses, but even so there is a minimum below which reductions cannot be made if the railway is to remain efficient, without which quality it would find great difficulty in carrying on at all, even if the Ministry which supervises were willing to allow it to do so. It is quite easy to see, however, that railway officials must recognise this tendency to constancy, and aim to obtain a large volume of traffic over which to average expenses.

On the whole, probably, it is safe to agree with the critics (1) that a substantial portion of the expenditure of the railways of the United Kingdom has no direct relation to the volume of traffic ; (2) that the great bulk of the expenditure is incurred on behalf of traffic as a whole and cannot be allocated ; (3) that while expenses are bound to increase as traffic increases, the rate of increase will not be in direct proportion to the growth of traffic. The significance of these points will be more fully realised later, when we come to deal with rates and fares.

**Main Points for
Consideration.**

CHAPTER III

THE EVOLUTION OF RAILWAY RATES AND FARES

BRITISH railway rates are not the result of, nor are they based upon, any well thought-out, clearly defined system. Expediency rather

British Railway Rates.

than scientific theory has been the principle upon which their framers have worked. They have been evolved empirically as traffic has grown from year to year, and consequently there is much about them that, on the surface, may appear illogical, inconsistent, and, sometimes, even unjust. Originally the railways were provided solely for goods, or rather, mineral traffic. Roads were so bad that the Durham mine-owners found it difficult to get coal from their mines to the port of shipment, although the distance was usually comparatively short. The physical difficulties in their way were removed by the provision of "rail-roads"—tracks of iron-covered planks, quite different from modern rails, and laid level with the earth's surface—along which horse-drawn vehicles were taken. No doubt they served a most useful purpose, not only in easing the task, but also in reducing the cost of transporting coal from the mines to the place of shipment. It is not necessary to dwell again on the fact that the locomotive engine also owes its origin to this same necessity for expediting and cheapening the cost of transporting coal. Still later, the Manchester and Liverpool Railway was another outcome of the necessity for an improved means of conveying goods and merchandise between those cities. The requirements of expanding commerce had already driven merchandise from the roads to waterways, natural and artificial, and these had been eagerly welcomed and warmly extolled because of the enormous increase in the area within which commercial exchanges became possible, and because of the equally large reduction in the cost of transport which they provided. Apart from the primitive colliery lines, however, goods were ousted by passengers at the outset. For this reason and because the evolution of goods rates occupied so long a period it will be well to deal first with passenger fares.

The original passenger accommodation was extremely primitive and the fares were high in comparison with those now charged. It was not until 1872 that the then Midland Railway Company

admitted third-class passengers to all their trains. For about a generation the third-class passenger had been a person of little account, admitted only to slow trains, and generally

**Early Passenger
Accommodation.**

the fare was fractionally more than 1d. per mile. Fast trains were reserved for first and, sometimes, second-class passengers, who paid at the rate of 3d. and 2d. per mile respectively. Some trains were not available even at these charges. He who travelled in them had to pay "express" fares, which were still higher than the rates mentioned. True, Parliament had imposed on the companies the duty of running outward and return trains each day at a maximum third-class fare of 1d. per mile; the "Parliamentary trains," which the middle-aged man of to-day remembers from his early years. But they were tediously slow trains.

The old Midland Railway departure was the beginning of a revolution in passenger travel. Other companies protested against the

**Midland Railway
as Pioneers.**

innovation; their protests were treated as impertinent interference, and eventually they found it expedient to follow the lead given them. To this may be traced the ordinary fares of to-day. Not only in charges did the Midland's enterprise cause a revolution. It was also the beginning of an immense change in the classification of passengers and the relative importance of the three sources of revenue. How great has been the change will be seen from the following comparative statement for England and Wales alone of the receipts from and the number of journeys made in each class—

Gross receipts from passengers—

	1871	1912	1925
First-class	£3,504,124	£3,106,023	£5,441,561
Second-class	4,596,317	993,759	554,066
Third-class	6,692,971	29,726,651	55,840,145
Season tickets	687,861	4,519,131	11,140,906
Workmen's tickets	—	—	4,115,577
Totals	<u>£15,481,273</u>	<u>£38,345,564</u>	<u>£77,092,255</u>

Number of passengers—

	1871	1912	1925
First-class	30,092,528	24,361,466	20,773,787
Second-class	73,011,105	12,236,526	2,773,097
Third-class	225,449,303	1,125,394,777	900,449,574
Workmen's tickets	—	—	308,584,456
	<u>328,552,936</u>	<u>1,161,992,769</u>	<u>1,232,580,914</u>

In the first edition of this book attention was drawn to the remarkable figures for third-class passengers. In the forty-two years then covered by the table the receipts from that source increased over 344 per cent. and the number of journeys over 388 per cent., while concurrently first-class receipts fell 11·3 per cent. and journeys 19 per cent. ; and second-class receipts and journeys 78·3 per cent. and 83·2 per cent. respectively. And the following comments were made—" During the period there has been a reduction in the charges for all classes and the general rate, instead of the special or ' Parliamentary ' rate, for third class has become 1d. per mile. This, however, is not the extent of the reduction. It would be interesting, if it were possible, to take account of the hundreds of thousands, perhaps millions, of excursionists and tourists who travelled at a rate which was substantially less even than 1d. per

Reduction of Passenger Rates.

mile. A finer illustration of cheap supply creating abundant demand could scarcely be imagined. The question which now concerns railway managers is not whether it pays to carry third-class passengers in all their trains, but whether it pays to carry first and second-class passengers, and, from the point of view of the managers at any rate, the latter part of the problem seems to be conclusively answered by the continuous and increasing abolition of second-class accommodation. The question, as it concerns first class, arises not so much from the reduction of fares, but because of the comparatively small number of first-class passengers and the unoccupied seats in the compartments set apart for them. In these days when the necessity for full loads has been so persistently drummed into the ears of the managers it is not surprising that their attention is drawn to the excessive dead weight which often is hauled for each first-class passenger. Fully loaded first-class coaches cannot be expected to be the invariable rule, and it may be argued against the proposition that first-class accommodation does not pay, that as the third-class passengers pay working expenses and yield a profit the revenue that comes from first class is superior or additional profit. The question of loss is, of course, relative. The passenger traffic as a whole yields a profit, and the individual who travels first-class pays double the usual rate, but sometimes the accommodation provided is so poorly occupied that the amount of dead weight hauled for his convenience

is excessive, with the result that, taken by himself, he is an unremunerative passenger."

All the quotation above, of course, is now out of date, but again it seems advisable not to delete these passages because they throw a very interesting light on the tendency of the times prior to the war, and because, also, they deal with what was then an important question in railway economics. Conditions have changed considerably since those days. The enormous increase in the cost of working the railways which has been referred to in the previous chapter, made it essential that there should be increase of passenger fares and goods rates. Passenger fares were raised 75 per cent. in 1920, and so the comparison of receipts as between 1912 and 1925 is vitiated, and the working out of percentages of receipts from passenger traffic would be valueless as a measure of the expansion of this part of the railway work. The separate statement of workmen's tickets also renders the comparison of numbers rather misleading, but taking these and third-class passengers together it is clear that the tendency previously commented on has been continuous, for there has been a further decline since 1912 of 14·7 per cent. in the number of first-class passengers, and of 77·3 per cent. in second-class passengers, while third-class and workmen have increased 7·4 per cent. And this has occurred in spite of the increased competition of omnibuses. This competition has increased enormously since the war, and it has not been confined to short distance urban and suburban traffic. The modern type of bus is now competing with the railways over distances of 20 miles or more, and is doing it on well organised, systematic lines. It is being used, also, for a seasonal excursion traffic which is now taking passengers from the heart of the Midlands to the coast, and covering distances of more than 100 miles. That there has been continued increase of third-class traffic in spite of this competition, and in spite of the increased charge for railway travel, is really most remarkable.

The piecemeal, empirical development of goods and merchandise rates has already been referred to. The original idea of a railway was that it would be a specialised sort of road along which traders would be allowed to haul their own vehicles, as they had done in the case of the existing canals, on payment of a toll. It is stated that the first ordinary

**Tendencies
since 1921.**

Goods Rates.

railway that carried a wagon load of coals was so afraid of the disapproval of passengers that the coal was covered by a tarpaulin. Whether true or not, the fact remains that the companies were originally intended to be merely the owners of the road bed and all other equipment for working which was thought necessary in those days ; and even when Parliament granted powers to supply trucks and to haul them by steam locomotives it was still thought that traders would be able to acquire and use mechanical haulage side by side with that provided by the companies on payment of the statutory tolls. But the companies once having been authorised to act as carriers and to make a conveyance charge as well as the toll for the use of the railway it soon became demonstrated that the idea of a railway being merely a specialised road open to the use (on payment of toll, of course) of all who cared to be their own carriers was impracticable.

It now seems obvious that the haphazard methods of canal transport must become impossible as soon as the companies began to
Development of Transport. organise their undertakings on these larger lines, but we are able to look at the problem with generations of practical experience to enable us to arrive at an opinion on such a subject. When the early regulations affecting railways were laid down no one had any experience of their working (it was all pioneer work) and further no one seems to have been gifted with an imagination capable of foreseeing these developments. For example, although Parliament had specified the tolls to be charged to traders for the use of the road-bed it was not thought necessary to fix either locomotive tolls, or conveyance tolls, as they were then called, because it was believed that the competition of outside carriers and traders would keep both within reasonable limits. It was not until experience showed this theory to be impracticable, until in fact the theory broke down, that Parliament thought it necessary to fix these new tolls. When this was done (in 1845) the three tolls (for use of the road for locomotives, haulage, and for provision of trucks) were consolidated and the total charge permitted was less than had been the aggregate of the three.

Thus early did Parliament begin not merely to exercise a restraining influence, but also to reduce charges. Without a break

this policy remained continuous right down to 1912 when the companies, having previously, under Government pressure exerted to end a strike, granted concessions to their employés, were given compensation in an Act authorising them to raise their goods rates. This was the only instance in roughly three-quarters of a century in which the restraining hand of Parliament was relaxed, until the pressure of the war and its disastrous after-effects caused two other increases to be sanctioned. These are dealt with later in a special chapter.

Yet another charge, in addition to the tolls already mentioned, remained to be evolved. The fact that the companies became common carriers as well as toll collectors made it necessary for them to have their own staffs to deal with the merchandise received ; to load and to unload it, and to provide warehouse accommodation. Naturally they claimed to charge for these services, which are now known as " terminals," and just as naturally their claim was resisted by the traders. Parliament, however, authorised the companies to make terminal charges, but it also fixed the maxima which they were not to exceed, and it also required the " terminals " to be specified separately from the already authorised charges.

During all this period there had been gradually evolving a " classification " of goods. In the pre-railway days the canal companies had roughly classified minerals, merchandise, etc., according to value, and had framed their tolls accordingly. The earliest railway tolls authorised by Parliament were based on the same principle. The following is an example afforded by the Manchester and Liverpool Railway¹—

	<i>Per Ton per Mile.</i>
For all limestone	Yd.
" " coal, lime, dung, compost, manure and material for roads .	1½d.
" " coke, culm, charcoal, cinders, stone, sand, clay, building, paving, and pitching stones, flags, bricks, tiles, and slates	2d.
" " sugar, corn, grain, flour, dyewoods, timber, staves, deals, lead, iron, and other metals	2½d.
" " cotton and other wool, hides, drugs, manufactured goods, and all other wares, merchandise, matters and things	3d.

The above only represents the charges authorised for the use of the road bed when the user provided his own vehicles and traction.

¹ W. M. Acworth : *The Elements of Railway Economics*.

When the company acted as carriers they were authorised to charge as follows, the charge allowed including the above tolls¹—

		<i>Per Ton.</i>	
		s.	d.
For all lime, limestone, dung, compost, manure and materials for roads, stone, sand, clay, building, pitching, and paving stones, tiles, slates, timber, staves, and deals		8	0
„ „ sugar, corn, grain, flour, dyewoods, lead, iron, and other metals		9	0
„ „ cotton and other wools, hides, drugs, groceries, and manufactured goods		11	0
„ „ wines, spirits, vitriol, glass, and other hazardous goods		14	0

These charges, apparently, were for the whole distance of the railway, about 30 miles. Two things will be noticed from these examples, (1) the fact that the greater the value of the articles which passed over the railway the greater the charge authorised, and (2) the limited number of things specifically mentioned. The latter is the point of importance in the present connection.

Very little consideration of the schedules will suggest that the time must soon come when the railway companies would require to supplement and elaborate this primitive classification. And, as a matter of fact, this is what did happen as the traffic grew. The companies did not long act independently in this matter. In 1842 they had established a Clearing House for the purpose of adjusting claims between the companies for services rendered to each other, such as those that were bound to arise in dealing with through traffic passing over more than one system. And, obviously, the business of clearing would be very arduous in the absence of uniformity of classification. The Clearing House produced a new, uniform, and much enlarged classification comprising 300 commodities, and its work evidently was continuous, for the following figures are given² as to the number of commodities included at the dates mentioned: 1852, 700; 1864, 1,300; 1889, 2,500. As usual with most of the doings of the railway companies, the making of this classification was brought within the purview of parliamentary authority, and in the end (1865) a Royal Commission recommended that the Clearing House classification should be approved and imposed on the companies in all subsequent railway Acts.

¹ Acworth.

² *Railways and Their Rates*: E. A. Pratt.

The Clearing House classification, however, does not deal directly with the rates to be charged. It does not say that commodities A, B, or C, shall be charged so much per ton. It merely sorts out the commodities into various classes and leaves the rate per ton to the companies themselves, in conformity with their parliamentary powers, of course. It will, therefore, be imagined that although the classification introduced a large measure of uniformity and went a long way towards simplifying charges, there still remained great confusion. Mr. Pratt, quoting from the House of Commons Select Committee of 1882, says : " There were 900 Acts [of Parliament] dealing with charging powers and in some cases reference must be had to more than fifty Acts [of Parliament] to determine the various rates the company is authorised to charge." The explanation of this multiplicity of Acts of Parliament is to be found, of course, in the number of small railway companies originally sanctioned. The great trunk lines with their many branches, as we know them to-day, are the result of the amalgamation of a multitude of small companies formed, and authorised, each by special Acts of Parliament, to work small sections of these trunk lines. For it must be remembered that in its inception the English railway system was miserably parochial in its scope ; its founders (except George Stephenson) were men of limited vision and imagination, as were their predecessors who gave us our canals. At any rate, so it seems to-day when one contemplates the immense systems that have been built up out of the disconnected fragments for which they were responsible. Perhaps this criticism may seem a little harsh, and to deny them the credit for what, in their day, when the railway was an untried thing, must necessarily have been regarded as unusual enterprise. Allowance has to be made for the fact that to think in millions is now much more common than it then was to think in hundreds of thousands. No doubt they did their best, but circumstances soon proved it to be a limited, confused " best."

Obscurity and confusion of railway charges led to the appointment of the Select Committee already mentioned, and from that to the Railway and Canal Traffic Act of 1888. This Act required every railway company to " submit to the Board of Trade a revised classification of merchandise traffic and a revised schedule of maximum rates and

**Clearing House
Classification.**

**Legislation
as to Charges.**

charges applicable thereto" . . . and "fully state in such classification and schedule the nature and amounts of all terminal charges proposed to be authorised in respect of each class of traffic and the circumstances under which such terminal charges are proposed to be made." It was further enacted that "in the determination of the terminal charges of any railway company regard shall be had only to the expenditure reasonably necessary to provide the accommodation in respect of which such charges are made irrespective of the outlay which may have been actually incurred by the railway company in providing that accommodation."

The Act required the revised classification and schedules to be submitted to the Board of Trade within six months of its passing, and then the Board of Trade was to consider them and such objections as might be lodged against them.

The New Schedules.

The next stage imposed was one of negotiation between the companies and the objectors. Failing agreement the Board of Trade was given power to fix both classifications and schedules. The task imposed on the Board proved to be immense. Thousands of objections were raised to the classifications and schedules submitted by the companies, and it became necessary to appoint Lord Balfour of Burleigh and Sir Courtenay Boyle to enquire into them. How great was the task of enquiry and revision may be seen from the fact that the schedules, etc., were lodged in February, 1889, and it was not until 1892 that the task was completed by the passing of the confirmatory Acts of Parliament. There were no fewer than thirty-five of these Rates and Charges Order Confirmation Acts, as they were called, passed in 1891 and 1892. The classification adopted was that of the Railway Clearing House, and it was divided into six sections, as follows: (1) goods and minerals; (2) animals; (3) carriages; (4) exceptional articles; (5) perishable articles carried by passenger train; (6) small parcels carried by merchandise train. Class 1, goods and minerals, was subdivided into A, B and C. The Act also insisted on the division of all rates into two parts—(1) conveyance charges; (2) terminal charges. But, perhaps most important of all, it introduced what has come to be known as the "tapering rate." The original Acts of most of the companies permitted a charge of so much per mile for any distance beyond 6 miles. The 1891-92 Acts imposed a rate for the first 20 miles, a smaller rate for the next 30 miles, a

still smaller rate for the next 50 miles, and an even smaller rate for the remainder of the journey. The result, of course, is that the greater the distance carried the smaller the average rate per mile for the whole distance. The following are examples of the schedules, as *finally* approved, for terminals and conveyance.

MAXIMUM TERMINALS.

CLASS.	Station Terminal at each end.	SERVICE TERMINALS.			
		Loading.	Unloading.	Covering.	Uncovering.
	<i>Per Ton.</i> s. d.	<i>Per Ton.</i> s. d.	<i>Per Ton.</i> s. d.	<i>Per Ton.</i> s. d.	<i>Per Ton.</i> s. d.
A.	3	—	—	—	—
B.	6	—	—	—	—
C.	1 0	3	3	1	1
1.	1 6	5	5	1.50	1.50
2.	1 6	8	8	2	2
3.	1 6	1 0	1 0	2	2
4.	1 6	1 4	1 4	3	3
5.	1 6	1 8	1 8	4	4

MAXIMUM RATES FOR CONVEYANCE.

CLASS.	For the first 20 miles or part thereof.	For the next 30 miles or part thereof.	For the next 50 miles or part thereof.	For the remainder of the distance.
	<i>Per Ton</i> <i>per Mile.</i>	<i>Per Ton</i> <i>per Mile.</i>	<i>Per Ton</i> <i>per Mile.</i>	<i>Per Ton</i> <i>per Mile.</i>
A.	0.95d.	0.85d.	0.5d.	0.4d.
B.	1.25d.	1.0d.	0.8d.	0.5d.
C.	1.8d.	1.5d.	1.2d.	0.7d.
1.	2.2d.	1.85d.	1.4d.	1.0d.
2.	2.65d.	2.3d.	1.8d.	1.5d.
3.	3.1d.	2.65d.	2.0d.	1.8d.
4.	3.6d.	3.15d.	2.5d.	2.2d.
5.	4.3d.	3.70d.	3.25d.	2.5d.

It will be seen that the classes differ from those previously given. The table gives the present lettering and numbering and the articles comprised in the classes include the following—

Class A.—Ammoniacal liquor, basic slag (unground), carbonate of lime (waste for manure), chalk (rough* for agricultural purposes), coal, clay in bulk, coal tar or gas tar, iron ore in bulk, manure, stone and undressed material for repair of roads.

Class B.—Alabaster stone in lumps, asphalte, basic slag, bars, billets, blooms and ingots of steel, cement, china clay, concrete slabs, distillers' or brewers' grains, drain pipes (common agricultural), ferro manganese, firebricks, granite, gravel, scrap iron, lime in bulk, rock salt, slate slabs (rough), sulphate of potash, tiles.

Class C.—Acetate of lime, antimony ore, bean sticks, bitumen, bone ash, copper ore, drain pipes (glazed), grain (such as wheat and barley), hay and straw, iron and steel (finished), oil cake, pig-lead, paper or wood pulp, wire ropes (old), spelter (ingots or plates), sulphur or brimstone, timber, vegetables, zinc (ingots or plates).

Class 1.—Apples, ale and porter, axe handles, axles and wheels, beds and cylinders of steam, gas and oil engines, blistered steel bolt and nut machines, borax, brattice cloth, broom handles, pit cages, candles and tapers, castings (light iron and steel), copper regulus, cotton (raw in press-packed bales), earthenware (not packed, S. to S.), fish (dried or cured), hydraulic machinery, malleable iron castings, paper, sheet lead and spelter, tinplates, wheels (iron or steel), yellow metal plates and sheathing.

Class 2.—Antifriction metals, brass axle-boxes, buckets and pails (iron), cheese, coal-cutting machines, coffee, copper, digging forks, electric accumulators, electric cable, files and rasps, flocks, gas engines, moulding machines, piston rods, and packing, preserved meat, shoddy, tin (blocks, cakes or ingots), wool (raw).

Class 3.—Aluminium bars, ingots, plates, rods and sheets, bicycle-fittings, boots and shoes, calicoes, cutlery, drapery (heavy), eggs, electric meters, fruit (ripe, not hothouse), German silver wire, groceries (mixed), guns (quick-firing and machine), hardware, india-rubber, lead pencils, merinos, morticing machines, motor bicycle engines, nickel, printers' ink, saddlery or harness, shirts, silk waste, silver ore, spirits (in casks or cases), typesetting machines.

Class 4.—Albumen, animals (live in packages), art tiles, asparagus, basket trunks, bells (large), billiard cues, carriage bodies, cigarettes, cobalt, copper boilers and cylinders, drapery (light), electric lamps, fancy goods, fresh fish, furniture (in vans), guns, lace, marble (carved decorative), meat (fresh), needle-wire, plated goods, skins (fine), spirits (in hampers, jars, or bottles), telephone apparatus, zinc tubes.

Class 5.—Amber, artificial flowers, bicycles, billiard tables, bird

cages, calculating machines, chloride of gold, clocks, fruit (hot-house), gold-leaf, hats (straw), incandescent mantles, mirrors, musical instruments, muslins, pianos, quicksilver, silk, watch glasses, wax heads, figures and flowers, woodwork (carved decorative).

It might be imagined that the years of hard work given to the subject by Parliament and the Board of Trade would evolve some-

thing that was finally satisfactory, producing
Unsatisfactory uniformity, and simplicity as far as that was prac-
State of Affairs. ticable, and removing all cause of complaint. Such
 an expectation, if, in fact, it ever existed, was destined to complete and speedy disappointment. The new schedules, of course, meant the framing of new rates. Every station dealing with goods traffic has a rate book in which Parliament requires to be entered every rate between that station and all other stations to which it forwards goods and merchandise. There are thousands of such stations and, it has been stated, millions of such rates. Thus an immense burden of work was thrown on the companies, whose business it at once became to examine all their rate books and rates to see that they were in conformity with the new obligations and restrictions imposed on them. Rough estimates were made that the reductions would amount to an annual sum of £500,000 sterling, but the cutting-down process was not general. Specific rates were mentioned on which the decrease ranged from 10 to 20 per cent. The great point was that for the future increases in rates could not be made. Whether the altered rates were few or many, however, the companies deemed it necessary to withdraw all their rate books and construct fresh ones. Possibly this would not have mattered very seriously had there been nothing but the class rates to consider. The new classifications and schedules being available the only other piece of necessary knowledge was the distance of any particular place to which it was desired to consign goods. Given these three requirements the rates could have been worked out as necessity arose and the new rate books gradually written up; and consignors would have been able easily to satisfy themselves as to the accuracy of the charges. All this, of course, presupposes that the consignments would complete their journeys on the lines of the company to which they were originally handed. Where they passed from the company's line to that of another company some complication would have been introduced, because the whole of the schedules

of charges were not identical, there being some variation between those of the different companies. Moreover, there were in some cases special sections of line, such as that through the Severn tunnel, where exceptional charges were permitted by Parliament either in the shape of higher mileage rates or of what may be called "bonus mileage." For example, the Severn tunnel is reckoned as 12 miles long ; and for some traffic the Forth bridge is counted as 23 miles and 14 miles for other. In consideration of the extra cost of these works Parliament has permitted an extra charge to be levied on all merchandise using them.

There was, however, a serious complication in the shape of "exceptional rates." These rates are reductions from the class

**Exceptional
Rates.**

rates and are granted for a variety of reasons. One of the most important of these is volume of traffic.

Where particular goods are frequently passing between two points in large quantity and may be depended upon to maintain a constant flow of traffic sufficient to afford good truck, or perhaps train, loads, when the goods are not easily liable to damage, or when there is keen competition, the companies concerned reduce their class rates. It is stated that about three-fourths of the goods and merchandise traffic of the country are carried at these "exceptional," or reduced rates.

The time allowed the companies to revise their rates was so short that it was not possible in all cases to deal completely with even the class rates, and to a very considerable extent the "exceptional" rates were untouched when the time came for the new charges to be put into operation. As a consequence, a considerable volume of traffic that had formerly been dealt with at "exceptional" rates was charged at the higher class rates. The immediate result was an extremely violent storm of protest throughout the length and breadth of the land. The charges were none of them above the legal maxima allowed by Parliament after so many years of laborious investigation and intricate work, but the futility of all this labour was at once apparent. Traders refused to pay their accounts and made vehement demands for further parliamentary interference. A House of Commons committee was appointed and reported that : "they failed to see that any increase was justified, that the action of the companies had unreasonably disturbed the trade of the country, and that it ought to be placed

out of their power to act in a similar manner in future.”¹ The committee also expressed the opinion that Parliament did not leave a margin between the old rates and the statutory maxima for the companies to take immediate advantage of it, but only to provide for certain contingencies such as a rise in prices or wages.

The result was the Railway and Canal Traffic Act, 1894, the first section of which enacted that : “ Where a railway company have,

**Railway and
Canal Traffic
Act, 1894.**

either alone or jointly with any other railway company or companies, since the last day of December, 1892, directly or indirectly increased, or hereafter increase . . . any rate or charge, then if a complaint is made that the rate or charge is unreasonable it shall lie on the company to prove that the increase . . . is reasonable, and for that purpose it shall not be sufficient to prove that the rate or charge is within any limit fixed by an Act of Parliament or by any Provisional Order confirmed by the Act of Parliament.” The Act also imposed on the companies the obligation to keep at their head offices, and open for inspection, a rate book showing the rates in force on 31st Dec., 1892 ; and it gave the Railway and Canal Commissioners power to make an order which virtually amounted to an authorisation to the complainant to withhold from his payments to the company concerned the amount of the increase about which he complained.

The effect of this Act was, of course, really to set up new and reduced maxima, because the companies were so bound down by it

**Effect of the
Act.**

that naturally they were chary of increasing rates which might have to be defended under the stringent provisions of what may quite fairly be called an antagonistic Act of Parliament. In the future increased profit balances could only come from greater economy of working rather than from increased charges. The restriction, which will be regarded as perfectly justified or otherwise according to the point of view of the critic, had two direct effects. It forced the companies to seek their economies by joint action in one or two directions which proved, as they were bound to do, most unpopular. And it forced them to be exceptionally careful of the reductions they made in existing authorised rates because of the extreme difficulty which would occur in restoring them to their former level should experience of their

¹ *Elements of Railway Economics*, by W. M. Acworth.

working prove them to have been based on mistaken calculations or assumptions, and therefore unprofitable. The economies which caused so much antipathy were based on such things as the joint dealing with claims. A very lax system of adjusting claims had prevailed. Consignors or consignees whose goods were damaged in transit claimed compensation and backed up their claims by a threat to transfer their traffic to a rival company unless the claims were met. As a general rule the claims seem to have been met ; and the companies alleged that often they were badly victimised. In the end some of them, particularly the London and North Western, Great Western, and Midland, as they were known before the amalgamations, whose interests clashed very considerably, especially in the Midland counties, came to an understanding that they would more rigidly enforce their rights in connection with " owner's risk " rates.

" Owner's Risk " rates apply principally to things roughly described as undamageable. They are not really incapable of being

**Owner's Risk
Rates.**

damaged, but they are such that given reasonably fair handling they are most unlikely to be injured during transit. The companies accordingly quote

a reduced rate in consideration of the trader agreeing to relieve them from such liability for damage as there may be. These reduced rates were largely used for some goods such as the various products of iron and steel, and, strange as it may seem, the companies appear not to have interpreted the " owner's risk " provision very stringently. Often in the stress of competition they acknowledged and paid claims where only " owner's risk " rates had been paid which, later, they came to denounce as preposterous impositions. Eventually the three companies came together on this question and simultaneously notified traders that in future traffic would not be accepted at owner's risk rates unless the consignor either signed a general agreement relieving the companies from all claims for loss, damage, misdelivery or delay, or failing this used the companies' own printed consignment notes embodying this clause in the terms on which the consignment was accepted. This new policy was strenuously resisted by the traders ; by those who may be described as reasonably minded and those who were otherwise, because a clause in the agreement and on the consignment note was regarded as too stringent. It required wilful

misconduct to be proved before the companies held themselves liable for damage, and it was rightly pointed out in reply that such proof was impossible unless the trader was able to follow the consignment throughout its journey ; and that, of course, was out of the question.

Other matters in which economies (or perhaps increased earnings is the better description) were sought were demurrage and warehouse charges. The companies came to the conclusion that in both these directions they had been unnecessarily lax, so the time allowed for the detention of trucks, or the free warehousing of goods, was reduced and the charges imposed for exceeding these free limits were more strictly enforced. To some business men these alterations were serious, especially in the case of free warehousing. Many merchants, such as those dealing with copper, and iron and steel, have no warehouses of their own. They use the railway warehouses and conduct their business from comparatively small offices situated in the centre of a large town. To provide warehouses in those central situations would be an expensive matter, to move their offices from the centre to an outlying district where sufficient warehouse accommodation would be obtainable at a much cheaper rate would be inconvenient. Naturally they protested against a charge which would increase their working expenses. Equally naturally the companies felt that they were entitled to make better and more remunerative use of the warehouses and rolling stock which they have provided.

**Pooling
Competitive
Traffic.**

A third way in which it was sought to improve profits was by means of joint working agreements to "pool" competitive traffic. Under these arrangements it was sought to make economies by avoiding duplication of services.

**Rates
Restrictions
Removed.**

In none of these directions, however, was the effort rewarded with any appreciable success, and it was not until 1913 that the companies got rid of the old 1894 restriction which prevented them from raising their rates and fares. Relaxation came, in the end, as a *quid pro quo*. A strike of railway men occurred in 1911. In the settlement negotiations the representatives of the Government promised (in return for concessions made by the companies at their request,

which would entail an increase in the cost of working) that the companies should be given freedom to recoup themselves by means of increased charges. A special Act of Parliament was passed, and in 1913 there was a general increase of about 4 per cent. in all goods and merchandise rates and an increase in passenger fares (particularly excursion fares) and in the season, or contract, ticket rates.

CHAPTER IV

THE AFTER-EFFECTS OF THE EUROPEAN WAR

THE departure from the policy of many years which occurred in 1913, when the 4 per cent increase in rates was sanctioned, was destined to be followed by several other and much more drastic increases. These represented such a complete reversal of policy that it is necessary to deal with them at length, and to do this involves references to matters which do not come within the scope of the evolution of railway rates and fares. The exigences of the war were responsible for many upheavals; perhaps none greater than those which occurred in connection with railways. In an earlier chapter reference has been made to the fact that they were taken over by the Government immediately war began, and remained under Government control until the middle of August, 1921—nearly three years after the armistice. During this period direct payment was not made for any services rendered to the Government, and there were no returns published showing earnings or profits, but *The Economist* is responsible for the statement that “up to the end of 1918 the railways earned more than the Government guarantee” i.e., the guarantee that the compensation to be paid the companies should be “the sum by which the aggregate net receipts of their railways for the period during which the Government were in possession of them fell short of the aggregate net receipts for the corresponding period of 1913,” or for the first half of 1914, whichever was the smaller. *The Economist's* statement means, in other words, that notwithstanding all the Government traffic which was carried without charge, the net revenue of the railways did not fall short of that of the standard period. This is a very remarkable fact, in view of the extent of the Government traffic which must have been enormous. And yet afterwards, in 1919, 1920, and 1921, it was necessary to award them “Government compensation” amounting to the sums of 33, 41, and 51 millions. Naturally this at once raises the question as to why there should have been this extraordinary reversal, or “set back.”

No one thing was entirely responsible, and, bitter as were the complaints made from time to time concerning the Government's handling of the railways, it would be a most unjust thing to lay all the blame at the door of the Government. In common with so many other industries, the railways felt the paralysing, exhausting consequences of the war; perhaps they felt it more than any other essential industry because of the peculiar nature of the services they render and the "plant" used in rendering them. Almost at the very outset of the war it became necessary to abandon valuable sources of revenue. Very soon they had to curtail passenger services, and tourist and excursion traffic was abandoned entirely. And as the war dragged on, increasing its seemingly exhaustless demands on the manhood of the country, things went from bad to worse from the purely railway point of view. The denudation of their "fit" male labour was carried, probably, to the utmost possible limit consistent with the safe conduct of the services which the Government found it expedient and necessary to leave to the public. Restricted services and a deficiency of fit experienced labour, of themselves, mean greater relative expense in working. Nor was this all. There came a time when the conduct of the war demanded, imperatively, a large increase in the communications in the rear of our lines in France. There was only one quick, serviceable way of getting the required increase—by using some of the home facilities. And so thousands of railway wagons and many locomotives were taken out of service in Great Britain and shipped to France. In places, even permanent way was sent to the same destination.

The profit earning powers of the railways were curtailed in other directions besides these. Every expense of railway working increased in common with those of all other industries. Coal, iron and steel, wood, paint, every "store" in fact, rose enormously in price. And labour costs advanced possibly to an even greater extent in the aggregate. It was inevitable, of course, that the wages of railway men should follow those of other industries, although it is but fair to add that the remuneration did not increase in anything like the proportions of that obtained by munition workers. Relatively, the improvement in the position of the railwayman was insignificant. In the aggregate, however, the additional burden

placed on the companies became considerable. The increases were given in the shape of "war bonuses" which ultimately totalled 38s. per week. The minimum pre-war rate for an adult was somewhere about 20s. per week so that with bonus added, it became 58s. In 1919 there was a wages strike. That circumstance is immaterial from the point of view of this book except as leading up to the fact that, as a result, the various minima of the companies were made uniform, the number of "grades" of labour was reduced, a permanent wage basis of a minimum of 100 per cent. above pre-war rates established, and an arrangement made whereby under a system of wages boards, the wages should fluctuate with the cost of living as shown by the Board of Trade Index Number.

It is obvious, therefore, that the diminution of profit earning powers of the railways was due to a conjunction of complex circumstances rather than to any one cause, although the remuneration of labour may be predominant. It certainly did not arise from a falling off in traffic. A White Paper issued by the Ministry of Transport in 1920 says on this point—

No Decline in Traffic. "With a decreased number of locomotives and wagons in traffic, and with a shorter working day [the reduction in the hours of work from 11½ to 8 hours per day], the railways are actually coping with a larger volume of work than in 1913. The total number of passengers carried by the sixteen principal railway companies (exclusive of season ticket holders) during the year 1919 was 974,259,966, an increase of 156,278,127 passengers, or 19·1 per cent. as compared with the year 1913. The number of season-ticket holders, equated to annual tickets, conveyed during the year 1919 was 735,172, an increase of 245,692, or 50·2 per cent. as compared with 1913. These season-ticket holders are responsible for from 100,000,000 to 150,000,000 additional journeys, so that the annual carriage of passengers is nearly 300,000,000 more than in 1913. Freight revenue on the controlled railways during the past year [1919], was nearly £5,000,000, or 7 per cent. more than in 1913, on the basis of the same charges and excluding Government traffic amounting to £21,000,000, of which probably one-half was freight traffic. The total freight receipts were, therefore, approximately 20 per cent. in excess of 1913."

There are only two ways of making good a deficiency of profits such as has been indicated—the continuance of the Government payment under the agreement (which means the payment of a subsidy from national revenue), or the increase of the earning capacity of the companies by means of higher fares and freight rates. Subsidies to

Making Good the Deficit.

industries are opposed to our national economic and commercial policy. It is not surprising, therefore, that the Government decided that subsidies must cease within a definite period, and that the railways must be given the power to pull themselves out of their difficulties by the increases mentioned.

As a matter of fact, increases began long before this period. Passenger fares were raised by 50 per cent. at the beginning of 1917. The ostensible reason for this, however, was not the making good of a deficit, because apparently the deficit had not then arisen, but the restriction of travel because of the stress of the war.

But obviously, the increase in passenger fares was not sufficient of itself to restore the companies to their normal profit earning capacity, otherwise there would have been no deficit for the companies and the Ministry of Transport to worry about in 1920. A really serious attempt to adjust the revenue balance was made in January, 1920, when, on the 15th of that month, percentage increases varying from 25 per cent. to 100 per cent., were added to the then existing class rates for goods, and also flat rates varying from 3d. to 1s. per ton.

The exact details of these increases as well as all the other subsequent variations are given in an Appendix.

These increases followed a principle which will be referred to in later chapters—that of charging what the traffic will bear. The more valuable the traffic the higher the percentage increase.

Not unnaturally it was hoped that these higher charges would restore the profit earning power of the railways to its old level.

Possibly it would have done so, but the rise in the cost of living gave the employees a further advance in wages under the arrangement already referred to, and, in addition, commodity prices increased. The railways, therefore, were faced with the certainty of diminished profits notwithstanding the higher charges they had been permitted to make. The Minister of Transport appointed an Advisory Committee to consider the subject and make recommendations as to the measures to be taken to make the railways self-supporting, and to relieve the country of further payments under the guarantee. The committee made two reports. The first recommended a further 25 per cent. increase in ordinary passenger fares, making, with that of 1917, a total addition of 75 per cent. to pre-war charges. The

Increases in Goods Rates.

Still Higher Rates.

normal rate for third-class travel, which had been one penny per mile, thus became $1\frac{3}{4}$ d., and, in addition, there were increases in workmen's fares and season ticket rates. It was obvious, however, that this advance would not bring in sufficient revenue to wipe out the deficit, and the goods rates must also be increased. On this subject the committee presented a report which contained some interesting figures. These stated that the actual deficit for the three months April, May, and June, 1920, was £9,900,000, and that the estimated total deficit for the sixteen months to 31st July, 1921 (by which date the Government desired the deficiency to be wiped out), was £66,000,000. Towards that the increase in passenger fares was expected to yield £17,000,000, leaving a total of £49,000,000 to be found by means of increased goods rates. To produce this sum in eleven months (from 1st Sept., 1920, to 31st July, 1921) the increase in rates would have to be such as would produce £53,500,000 in a year. To raise this money the committee recommended an increase of, roughly, 100 per cent. on all traffic, and a larger flat rate, ranging from 6d. to 1s. per ton. These increases became operative on 1st Sept., 1920, and remained until 1st Jan., 1922. They were very heavy increases amounting, with the 4 per cent. allowed in 1913, to 104 per cent., plus the flat rate, over the maxima charges which were in force for so many years prior to the war, and it is not surprising that there were many complaints as to their arduousness.

They pressed with particular severity on such things as coal, and iron and steel in their primary stages, and through these reacted on the whole range of manufactured products.

Rapid Remissions. It is not surprising, therefore, that the first remissions were made in connection with these materials. On 1st Jan., 1922, reductions were made in coal, iron and steel, etc., which brought the percentage increase down to 75 per cent., and the flat rate to 4d. per ton. Evidently the companies were in some doubt as to their ability to make these reductions, because in the announcement issued from the Clearing House they were described as "experimental," and were only put in force until 31st Dec., 1922; but as soon after as 22nd May, 1922, further reductions (again described as "experimental" until 31st Dec., 1922) were announced. By these the flat rate on coal, etc., was reduced to 3d. per ton. On iron ore and cognate raw materials for iron and

steel manufacture the percentage was reduced to 50 per cent., and the flat rate to 3d. On manufactured iron and steel in class B the flat rate was reduced to 3d. per ton, and a number of other raw materials, such as agricultural manure, were reduced.

The announcement of these reductions was accompanied by an extraordinary document, half explanatory, half apologetic.

An Extraordinary Document. It is not often the railway companies condescend to explain anything they do, but in this case this is what they said—

"In December last the English and Welsh railway companies in notifying particulars of reductions in rates to operate from 1st Jan., 1922, intimated that they would give consideration to the question of making further reductions as soon as circumstances admitted of their doing so. Since the reductions in January last the companies have met several deputations, the representations made thereat practically covering every branch of industry throughout the country. In every instance the companies were asked to make a substantial reduction in the existing rates, including those applicable to traffics for which reductions had already been made.

"The companies were fully impressed by the representations made as to the industrial position, and are desirous, as far as their finances admit, of assisting the trade of the country by reducing their transport charges. After careful consideration the railway companies some few weeks ago came to the conclusion that they could not make an all-round reduction in rates; it appeared to them that in present circumstances the only practicable course was for them to continue the policy previously followed, and to give such relief as they could afford in the main to the carriage of raw materials. Certain reductions were then agreed between the companies, but the announcement in respect of these reductions was postponed, having regard to the unsettled state of trade, more particularly in the engineering and shipbuilding industries. Whilst the differences in these industries have not yet been entirely settled, and the further prolongation of the disputes may have a serious effect on railway revenues, the railway companies have come to the conclusion that they will no longer suspend the operation of the reductions . . .

"The traders in all branches of industry have called attention to the considerable reductions in wages which have been accepted by their employees, who are thus taking their share of the industrial depression, and it has been repeatedly and most strongly urged that in fairness the wages of railway men should be brought more into relation with the wages paid to men engaged in other industries than is at present the case.

"The continued operation of the sliding scale agreement and the application of the recent award of the National Wages Board in the case of the Scottish companies to the whole of the operating staff of the English and Welsh companies means that from the 1st April there has been a reduction of 4s. per week in the rates of pay of those grades. Further reductions will result if the cost of living continues to decline until the wages fall to the standard rates fixed under the provisions made between the Government and the Unions during the Government control of railways, but the fact remains that, even when the sliding scale arrangement has operated to its fullest extent, the standard rates will remain at a figure of practically 100 per cent. above pre-war rates of pay.

"By far the largest item of railway working costs is represented by wages, and it will be realised that the railway companies cannot bring their freight charges down to a figure bearing any near relation to pre-war charges until their working costs assume more reasonable proportions.

"The railway companies believe that the position is appreciated by the railway unions, and they are hopeful that it may be possible for the management and the unions to make such adjustments, both in regard to standard rates of pay and other conditions of employment, as will assist, so far as this can be accomplished by railway charges, in a resuscitation of the trade of the country."

This document has only an indirect bearing on the subject of this chapter, but it is so unusual, and it throws such a significant light on the proportion of wages in the cost of transport, that it seems worth reproducing in full.

Still another reduction (the third) was made in 1922—on 1st August. Some of the percentages were reduced, and most of the flat rates and the reductions extended over the whole of the classes in the General Railway Classification. It was the first comprehensive decrease that had been made since September, 1920.

There have not been any further reductions since this, but in the interval an enormous amount of work has been done with the object of revising the whole system of rates. The reductions made in 1922 were rapid and extensive, but notwithstanding there was a general feeling that the remaining increases were still burdensome.

**Revising the
whole system
of Rates.**

Such was bound to be the case as long as the charges continued to be in excess of those of pre-war days, but, on the other hand, the railway companies were faced with an enormous increase in their expenditure. For instance, in 1925 there was an increase of 116·1 per cent. in their total expenditure, and of 117·9 per cent. in their purely railway expenditure, as compared with 1913, and in the two immediately preceding years the totals under both headings were even higher than those for 1925. Obviously it was not easy for them to make further concessions on a scale sufficient to satisfy the desires and opinions of the trading community, but there was an insistent call for something to be done, and as a matter of fact, the Government had provided the means for doing it in the Act of 1921 which, *inter alia*, set up a Railway Rates Tribunal.

Fuller details as to the constitution, composition, and duties of this Tribunal are given in the later chapter dealing with "Government Control of Railways," but it is desirable to set out here the object the Government had in view; that has been behind and is actuating all that has been and will be done. Section 58 of the Railways

**The Object of
the Revisions.**

Act, 1921, is headed "Adjustment of Charges to Revenue," and says—

"(1) The charges to be fixed in the first instance for each amalgamated company shall be such as will, together with the other sources of revenue, in the opinion of the rates tribunal, so far as practicable yield, with efficient and economical working and management, a net revenue (hereinafter referred to as the standard revenue) equivalent to the aggregate net revenues in the year nineteen hundred and thirteen of the constituent companies and the subsidiary companies absorbed by the amalgamated company together with—etc."

The remaining sub-clauses deal with the interest to be allowed (and added to the net revenue of 1913) in respect of capital expended in 1913, but not then fully remunerative, and capital since expended.

It may be commented that the section opens up a wide field of discussion on the terms "with efficient and economical working and management." People's opinions on this subject are apt to vary considerably with the mood they are in, and possibly because of some slight, but very irritating, incident in connection with railway working of which they have been the victims. But there it is.

It was the intention of the Act that the rates tribunal should get to work quickly, and it did so, the first thing tackled being the revision of the "General Railway Classification of Goods by Merchandise Trains" to give it its full title. In December, 1920, the Railway Clearing House produced a very formidable document running to 187 pages, and containing the provisional proposals for amending the classification for submission to the rates advisory committee.

It is impossible to reproduce or even summarise this document which apparently reproduced every one of the thousands of articles in the classification, stated the class they were then in (and are now) and the proposed new classes. All that can be done is to set out the comparative table showing the relation of the proposed classes to the existing classes. (See page 136.)

The very obvious feature of the proposed new classes is the extensive regrading they represent, and the opportunities presented for a graduation of the rates from class 1 upwards. Another matter of interest is the importance attached to the size of loads. For example, the new classes 1 to 6 all apply to loads of not less than 6 tons, which is to be their normal, but if the same

Revision of the Classification.

Extensive Regrading and Graduated Charges.

Present Class.	Revised Class.	Unless specifically otherwise provided, the revised Classes apply as follows—		
		4 tons. Class.	2 tons. Class.	Less than 2 tons. Class.
A.	{ 1 (6 tons) (O.W. Scale) 2 (6 tons) (O.W. Scale)			
B.	{ 3 (6 tons) (O.W. Scale) 4 (6 tons) (O.W. Scale) 5 (6 tons) 6 (6 tons)	7	10	12
C.	{ 7 (4 tons) 8 (4 tons) 9 (4 tons) 10 (2 tons)	—	10	12
1.	{ 11 (2 tons) 12 13	—	—	12
2.	{ 14 15 16	—	—	—
3.	{ 17 18	—	—	—
4.	19	—	—	—
5.	20	—	—	—
Spl.	21	—	—	—

(NOTE.—O. W. Scale means Owner's Wagon Scale.)

commodities are handed to the companies in small quantities they are put into higher classes. As an example, take unground basic slag, which is in the present class A. The proposal was to put it into class 2, for which the suggested 6 ton standard rate was 2·15d. per ton per mile for the first 20 miles or part thereof. If, however, the quantity consigned were less than 6 tons but not less than 4 it would go into class 7, for which the standard rate proposed was 2·90d. per ton per mile for the first 20 miles; if the quantity were less than 4 tons but not less than 2 tons, then it would go into class 10, for which the rate proposed was 3·50d. per ton per mile for the first 20 miles. Finally, quantities of less than 2 tons would go into class 12, and be charged at 3·90d. per ton per mile for the first 20 miles. The whole object of the arrangement, of course, is to stimulate the concentration of traffic into large loads, and so facilitate its economical handling.

The railways having launched this formidable document, which indicated the present class and the proposed class of thousands of

**Revising the
Classification.**

commodities, there began the herculean task of examining it. Fortunately it was dealt with on well organised business lines. Through the instrumentality of the Federation of British Industries, a 'Traders' Coordinating Committee' was formed which embraced representatives of the Chambers of Commerce and the principal manufacturers' associations throughout the country. It is not an exaggeration to say that never before in railway history was any question of rates or classification tackled so systematically and thoroughly. The representatives of the trade associations sorted out the various commodities in which they were interested, and then looked for anomalies in the classification gradings of those materials. They, of course, were peculiarly qualified to estimate the relative values of the different materials, and to see that those of lower value were not classed with others of higher value. What happened in the non-ferrous metal industry will perhaps serve as a concrete illustration. This industry deals not only with the "virgin" metals, copper, tin, spelter, lead, aluminium, and the manufactured products in which they are used (brass and gun metal, and other alloys), but also with residuals, or waste products as they are called, though they are seldom wasted. Quite a lot of non-ferrous swarf, for instance, is purchased from manufacturers of finished goods, re-melted, and used again. Copper locomotive tubes having ended their useful service in that connection are purchased from the railway companies as scrap (though relatively very valuable scrap), and can be drawn down again to serve other very useful purposes. One of the tasks of the representatives of the non-ferrous industry was to see that these virgin metals, finished products, and valuable residuals were classified, or in other words graded, so as to secure some logical conformity to their relative values.

Similar work was done by the representatives of other trades, but the one illustration given will serve to show what has been accomplished. The work is now finished, and the classification in its final form has been adopted, although at the time of writing the "appointed day" for it to come into operation has not yet been fixed, and the railways are still working to the old classification. What the result will be when it comes into operation has yet to be

seen, of course. It may be the most satisfactory, logical thing of its kind yet created in connection with railway working; it may be found from experience that it is full of imperfections. If it is, it will not be for want of "trying." In the aggregate the work done in hammering it out to its final form has been enormous. A few examples from the new classification compared with the old are given in an appendix.

After classification, of course, come rates which divide themselves into two sections: (1) standard rates, (2) exceptional rates. The former represent the maxima mileage rates the companies are allowed to charge for the different classes of traffic, and the latter the special rates reduced below the maxima which the companies have made where volume and constancy of traffic and such considerations have enabled them to share the resulting economies with the traders. The latter may be dealt with first. It has already been mentioned that it is estimated that 75 per cent. of the goods traffic of the country is carried at exceptional rates. When the number of stations from which goods are consigned and the great variety of goods are remembered the immense number of these exceptional rates may be imagined. It is said to run into millions, but in any case the task of revision was formidable. The 1921 Act provided (Section 36) that—

**Exceptional
Rates.**

"(1) On and from the appointed day (i.e. the day when the new rates come into operation) all exceptional rates in operation immediately before the appointed day on the railway of any amalgamated company, or any company to which a schedule of standard charges has been applied, shall cease to operate, with the exception of such exceptional rates as—

(a) are not less than 5 per cent. below the standard rates which would otherwise on and from the appointed day become chargeable; and

(b) have been confirmed by agreement in writing between the railway company and the trader concerned or, failing agreement, have been notified in writing to the secretary of the railway company by the trader with a request that they should be referred to the rates tribunal for determination by them, in which cases the rates shall continue until determined by the rates tribunal, and the onus of proving that any such rates should be altered or discontinued shall be upon the railway company;

so nevertheless that no rate which has not been applied to the charging of merchandise actually forwarded within two years preceding the first day of January nineteen hundred and twenty-three, shall be continued unless the trader can prove to the satisfaction of the railway company, or failing agreement with the railway company, to the satisfaction of the rates tribunal—

(i) that its non-application is solely due to abnormal conditions of trade; or

(ii) that a rate of equal amount to the same destination remains in operation at other stations or sidings in the same group or area.

Provided that, if the trader and the railway company agree to continue any

rate which will be more than 40 per cent. below the standard rate chargeable as aforesaid, the rate shall, before the appointed day, be referred to the rates tribunal, and, if so referred, shall continue until the tribunal have determined the matter.

"(2) Any such agreement or determination may provide for the continuance of any exceptional rate at the same or any higher figure or charge, not being, in the case of an agreement between a railway company and a trader, less than 5 per cent. nor more than 40 per cent. below the standard rate chargeable, and for a specified period of time."

The section is very verbose, as Acts of Parliament usually are, but the one thing most impressive is the impossible task it puts on the traders (and on the railway companies too) of continuing each individual exceptional rate "by agreement in writing." Quite early the impossibility of doing this was recognised, and to get over it the railway companies agreed that the existing exceptional rates should be continued to the 31st Dec., 1925, the "appointed day" contemplated being 1st Jan., 1926; that between 1st Jan., 1924, and 31st Dec., 1924, the railway companies would take a record of all exceptional rates used; that the railway companies would examine them and publish in their new rate books the exceptional rates they proposed to continue in operation after the appointed day; and that any rate not so included which a trader desired to retain must be notified by him in writing to the secretary of the company concerned with a request that it be referred to the rates tribunal for determination. Exceptional rates which the companies considered should be adjusted were to be specially recorded and published. This arrangement was calculated to save every one concerned a great deal of labour. Its final results were not known at the time of writing, but evidently it indicated the intention of the railway companies not to "scrap" all the exceptional rates either permanently or temporarily as they did years ago, when the last considerable revision was made.

The question of "standard rates" also is still under consideration, and so far no one can say when the work will be finished, because

Standard Rates.

in its way it is not any less complicated than that entailed by the revision of the classification or the exceptional rates. It will be remembered that the 1921 Act authorises such new and increased standard rates as will give the companies a net revenue equivalent to that of the year 1913, plus additional revenue in respect of new capital put into the business, but not fully operative, before the end of 1913, and that has been put in since. Exactly what is meant by the

Standard Charges is indicated by the tabular statement which follows later. This particular one is the one put out by the Great Western for their English and Welsh traffic, and is exactly the same as those of the London, Midland and Scottish and the London and North Eastern. The Southern railway's proposed rates are higher, as are also those proposed for Scotland by the two companies having Scottish connections. (See next page.)

It will be interesting, and will well repay the reader, to compare this table with the one giving the standard (or maximum) rates in force in 1913, which is given in the preceding chapter, and also to compare both with the tabular comparison of the old and new classes which appears earlier in this chapter. It will be seen that throughout the classes relatively large increases are proposed and that the ton mile rates ascend to much higher limits. It will also be most interesting to take the rate for any class and see how the reductions for distances average down the whole charge for a long journey. For example, one ton of goods in class one carried for the first 20 miles would cost 38d. ; for the next 30 miles it would be 28·5d., together the charge for 50 miles thus amounts to 66·5d., which gives an average rate of 1·33d. per ton per mile. Carry the same ton for another 50 miles and the additional charge is 27·5d., which makes the total for 100 miles 104d. (8s. 8d.), or an average rate of 1·04d. per ton per mile. Take it still another 25 miles and the addition is 25d., making the total 129d. (10s. 9d.), and giving an average rate for the whole journey of 0·86d. per ton per mile. All this is very elementary, of course, but it is extremely interesting to see how the charges average down with distance.

The schedules of these new proposed standard rates were issued to the public in the fall of 1923 ; they are still (September, 1926) under discussion, and the " appointed day " has not been fixed ! From this one fact may be assumed the amount of work the rates tribunal, the railway companies, and the traders representatives have had to do. In all probability very large calculations of tonnages, distances, and earnings at the new rates have had to be made in order to see how the proposed rates will accomplish their object and give the companies their 1913 net revenue. Work such as this, however, has been much too uninteresting to secure publicity, and only the people actually engaged in it know how it has progressed.

GREAT WESTERN RAILWAY COMPANY

Scale of Charges in respect of Goods and Minerals, except Coal, Coke, and Patent Fuel, by Merchandise Train.

CLASS.	STANDARD RATES FOR CONVEYANCE.				STANDARD TERMINALS.						
	For the first 20 miles or any part of such distance.	For the next 30 miles or any part of such distance.	For the next 50 miles or any part of such distance.	For the remainder of the distance.	Station Terminal at each end.	Service Terminals.					
	Per Ton per Mile. d.	Per Ton per Mile. d.	Per Ton per Mile. d.	Per Ton per Mile. d.	Per Ton s. d.	Per Ton. s. d.	Per Ton. d.	Per Ton. d.			
1. In	1.90	.95	.55	.50	0 3	—	—	—	—	—	—
2. In	2.15	1.05	.70	.65	0 5	—	—	—	—	—	—
3. Owner's	2.25	1.10	.80	.70	0 6	—	—	—	—	—	—
4. Wagons	2.30	1.20	.90	.75	0 10	—	—	—	—	—	—
5.	2.60	1.25	.85	.75	0 6	—	—	—	—	—	—
6.	2.65	1.35	1.05	.80	0 10	—	—	—	—	—	—
7.	2.90	1.60	1.20	.95	1 0	—	—	—	—	—	—
8.	3.05	1.75	1.35	1.00	1 2	—	—	—	—	—	1.25
9.	3.20	1.90	1.50	1.05	1 4	—	—	—	—	—	1.25
10.	3.50	2.30	1.75	1.10	1 7	—	—	—	—	—	1.50
11.	3.75	2.55	2.10	1.45	2 0	—	—	—	—	—	1.50
12. In	3.90	2.70	2.25	1.60	2 5	0 6	0 6	0 8	2.50	2.50	2.50
13. Railway	4.25	2.90	2.50	1.75	2 5	0 8	0 8	0 8	2.50	2.50	2.50
14. Company's	4.55	3.20	2.65	2.10	2 5	0 10	0 10	0 10	3.00	3.00	3.00
15. Wagons.	4.80	3.45	2.95	2.30	2 5	0 11	0 11	0 11	3.00	3.00	3.00
16.	5.05	3.70	3.20	2.65	2 5	1 1	1 1	1 1	3.00	3.00	3.00
17.	5.50	4.15	3.35	2.90	2 5	1 4	1 4	1 4	3.00	3.00	3.00
18.	5.85	4.50	3.70	3.20	2 5	1 7	1 7	1 7	3.00	3.00	3.00
19.	6.80	5.30	4.40	3.85	2 5	2 2	2 2	2 2	5.00	5.00	5.00
20.	8.00	6.25	5.75	4.40	2 5	2 8	2 8	2 8	6.00	6.00	6.00
21	12.00	9.35	8.65	6.55	3 7	4 0	4 0	4 0	9.00	9.00	9.00

Fractions of less than one halfpenny in the rate to be dropped, and fractions of one halfpenny or over to be charged as one penny.

If, however, the proposed classification and standard rates receive sanction in their original form, it is certain that most trades will have to bear a very heavy increase in the cost of their transportation as compared with pre-war days. Probably it is inevitable that it should be so in view of the large increase in the cost of railway working ; an increase due to causes which will not soon (if ever) be removed. What the proposed increases mean can be illustrated by one or two examples collected by a manufacturers' association for the information of its representatives who were dealing with the subject before the rates tribunal. The actual names of the commodities are suppressed, and they are referred to by letters, but the names are in the writer's possession, together with the journeys on which the calculations are based.

Commodity.	Present Class.	Distance of Journey.	Present rate per ton s. to s.	Proposed new Class.	Proposed new rate, per ton s. to s.	Percentage increase.
		Miles	s. d.		s. d.	
A	1	86	24 11	13	28 5	14
B	2	53	23 0	15	24 6	6.5
C	3	88	36 2	18	41 3	14
D	2	204	49 3	16	61 6	24.7

All the present rates given above include the percentage increases and flat rates. From this it will be seen that (in the particular instances given at any rate) the proposed rates are a substantial further addition to the already existing increases. It may be suggested that they are selected for the purpose of proving a case, but the writer, having seen a number of similar computations made by other firms, does not think so. If they are selected, however, their value does not disappear in consequence, because they still prove that there were appreciable increases in the schedules proposed, and that the schedules required very careful examination by the traders as a matter of self-protection.

It is regrettable that at the time of preparing this fourth edition the work of settling the new standard and exceptional rates is still incomplete, and that the subject cannot be carried to what must ultimately be its conclusion.

CHAPTER V

THEORIES AS TO THE BASIS OF RAILWAY RATES

So far we have been dealing with the evolution of railway rates. It is now necessary to examine the purely economic side of the subject : to discuss the principles on which railway managers have acted in the past when framing their rates and the prevailing public opinion as to how they should act. For it has to be admitted at the outset that there is no subject on which public opinion is so generally, or so unanimously, opposed to the conditions that prevail. A large majority of the business men who have anything at all to do with railway consignments is dissatisfied with, and keenly critical of, the principle which underlies the system of railway rates. The complaints generally made are that charges are excessive ; that their basis is theoretically unsound ; that their effect results in an unjust discrimination against different kinds of goods and merchandise, against individuals and districts, and against home as compared with foreign imported produce. The complaints are all old ; they have been discussed time after time ; they have formed the subject of enquiry by several parliamentary committees ; but they persist, and must be dealt with again in detail.

One of the most common criticisms is that rates are unjust because they are not based strictly on cost of service. It seems to the superficial observer so simple to ascertain what is the actual cost of service. In business, cost of production is regarded as the first essential fact for a manufacturer to know. Without such knowledge there is the inevitable danger of unprofitable production and ultimate bankruptcy for the man who neglects it. And so the business man takes good care to get out an average which will represent with sufficient practical accuracy what it costs him to produce a particular article. He also gets out an average which represents the cost of marketing his products and the various "dead expenses" inseparable from his business. With these two facts before him he is supposed to be able to fix his selling price on a basis which will not only cover his costs of production and dead expenses but also give him a reasonable profit as a reward for his industry and

the capital he employs. Whether, however, all "costing" proceeds in this simple manner is another question. In the actual affairs of business symmetrically balanced theories such as these often have to give way to the exigencies of compelling circumstances. Instead of starting from the bottom and saying direct production costs me so much, dead expenses amount to so much, and my profit should be so much, therefore my selling price must cover all these things, he has to start with the knowledge that the market price for a particular commodity is already fixed for him and that being so he must make the other components of the selling price fit into the figure which he knows he cannot exceed. He may have a great admiration for his theory, but if he adheres to it and ignores stubborn facts his efforts are liable to failure. The symmetrical theory of costs first and selling price after is therefore not of quite such universal application as might at first seem certain. But in any event the manufacturer can always obtain a sufficiently good average cost figure for all practical purposes.

It is not so with the railway manager. He is dealing with a complex organisation not solely engaged in carrying goods traffic.

**Parliamentary
Requirements.**

Before Parliament permits him to use his railway (for passenger traffic, at any rate), he must have a system conforming to certain requirements as to which he must satisfy the Ministry of Transport—the body to which Parliament has delegated the duty of supervision. The road bed must attain a certain standard ; so must the station and siding accommodation ; so must the signalling arrangements ; so must the rolling stock. Parliament, in the interest of public safety, even interferes with the number of hours worked by the employees whose labour he controls. The bulk of what constitutes a railway system has been provided for the use of both passenger and goods traffic indiscriminately, and it is so used. Who, then, is to disentangle the complications and say that the cost of moving a particular commodity a certain distance amounts to a particular figure ?

This cannot be done from the expenditure figures as tabulated in the Ministry of Transport Return. Maintenance

**Cost of Different
Services.**

of way and works, which it has been seen amounts to over £23,000,000 out of a total expenditure on the railways proper of £165,000,000, cannot possibly be accurately

divided between goods and passenger traffic. The cost of passenger station maintenance, of course, could easily be separated, but how is the expenditure on permanent way, signalling apparatus and similar arrangements to be apportioned? It might be divided on a proportionate basis according to the relative receipts from passenger and goods traffic, but that would be a very rough approximation and might not necessarily bear any sort of relationship to the actual cost attributable to each source of revenue; and also, it has to be remembered, if goods alone were being dealt with, if the railway did not carry passengers, the "way and works" would not need to be kept in nearly as perfect a condition as they are where a mixed service prevails.

Maintenance of rolling stock (£28,000,000) is now apportioned, but this could hardly be the case with the amount put down as traffic expenses (£55,000,000) or general charges (£5,800,000). We therefore get roughly £94,000,000 out of a total of £165,000,000 of expenditure, which would be extremely difficult to divide between the two sources of revenue—goods and passenger. Scarcely anything is impossible in modern accounting if the book-keeping ground-work is sufficiently good, but obviously the possibility of basing rates on "cost of service," with any reasonable approach to accuracy, is not only very doubtful but the labour entailed would be such as to make it scarcely worth while attempting so great a task for such problematical results.

To get at the essential facts it would be necessary, for instance, to analyse the work of each signaller and platelayer; to say that so many hours were spent by the one in signalling for goods traffic and so many hours by the other in repairing the permanent way so that it may be efficient for the use of goods and mineral trains. Both sets of men are engaged intermittently and indiscriminately in dealing with both goods and passenger traffic; thus, even though it were possible, the task of apportioning the cost of their labour between the two services would be stupendous. The practical railway manager regards it as scarcely worth the trouble, and the same conditions apply to a very large extent throughout the system. According to some expert opinion, it is even open to argument whether the expenditure on way and works and some part of that on working the traffic could not be altogether ignored where goods and mineral traffic are

Difficulty of Analysis.

concerned. Solid substantial permanent way and elaborate signalling arrangements are the requirements of passenger traffic, not of goods, and the railway manager would not be excessively unreasonable if he argued that these things were required in so perfect a condition for passengers only and therefore he was entitled to ignore their cost as far as goods are concerned. If his railway carried no goods he would still be required to maintain the whole of the permanent way in its perfect condition, though as the wear and tear would be smaller the expense would be correspondingly diminished. But, on the other hand, if his line carried no passengers the expenses under both headings would be enormously reduced. Goods and mineral traffic could be worked under much more primitive conditions than those required for passenger traffic.

If, however, the zealous manager insisted on getting out cost figures the result obtained would be to a large extent an unrepresentative arithmetical average having no real vital application to the actually existing railway. Costs necessarily differ with various sections of the line.

**Unsatisfactory
Figures.**

Gradients vary, and therefore it costs more in actual haulage expenses on some sections of the line than on others. For the same reason cost of construction varies in the different sections and so the allowance for interest on capital must correspondingly vary, and if exact costing is to be obtained then a general average for the whole system would be quite hopelessly inaccurate in such cases. Another factor which would prove inconvenient in the settlement of such a problem is the variation in the volume of traffic. On main lines where the volume of traffic is largest the cost of service would be spread over a large number of units and the average would be small. On less important lines with a smaller volume of traffic the average per unit would possibly be larger; at any rate, it is doubtful if it would at all correspond with the cost per unit on the main lines. It is quite probable, therefore, the cost of service charges, if strictly and mathematically carried out, would lead to even greater inequalities than there now are and would cause an even bigger outcry than is sometimes heard under present conditions. It would penalise some districts and would put manufacturers carrying on operations in them out of some of the markets now open to them. It would inevitably mean that goods of low value could not be carried for any distance; they would be driven off

the railways and put out of markets. And even average costs would do it in some cases.

It must not be assumed that the inference is that cost can be entirely ignored ; that, of course, is absurd. The point is that the railway manager cannot afford to apply the cost of service principle strictly and logically or he would lose traffic that now brings him something, at any rate. He has a lot of dead charges that must go on. If he is to run a railway at all they are bound to be incurred and it will pay him to get traffic so as to spread these costs over a large number of units and bring down the average. One of the most important things that should be constantly before his mind is to keep his system as fully occupied as its physical limits will permit. The system must either be well maintained or abandoned, and if he is to maintain it, it will pay him best to use it to the fullest possible extent.

The late Sir Wm. M. Acworth, who, as a railway director, had close inside knowledge of the subject, who was a member of the Board of Trade Departmental Committee on Railway Accounts and Statistical Returns, and who in recent times probably had a greater and more widespread influence on railway policy than any other single individual of his day, has gone into this aspect of the subject in some detail in his book, *Elements of Railway Economics*. Dealing with the headings of expenditure in the Board of Trade Returns the points he makes are : (1) General charges have slight connection with the amount of work done ; (2) about three-fifths of the cost of maintenance of way and works is independent of the traffic passing over the lines ; (3) much of the expenditure on maintenance of rolling stock is due not to the stock being worn out but to its becoming out of date, and therefore rolling stock which would otherwise be unemployed can be profitably employed if the receipts cover maintenance proper, though not replacement ; (4) a considerable part of the traffic expenses is non-apportionable. His conclusions, therefore, are (1) the great bulk of the traffic expenses cannot be allocated ; “ no one knows or can know, what the cost of carriage is ” ; (2) expenses increase as traffic increases but not in direct proportion.

Briefly summarised, the points against the strict application of charges based on the cost of service are ; (1) From the point of view

**The late
Sir Wm. M.
Acworth's
Opinion.**

of the trader it would not work ; it would place an insupportable burden on some individuals and some kinds of traffic and would force traffic off the railways ; (2) From the point of view of the railway managers it would be (a) too complex to be obtained in sufficient detail to be of real value ; (b) and if it could be obtained it would ignore the equally important principle that, as there is so large an expenditure that cannot be avoided if the railway is to exist and be worked at all, it will pay to deal with the traffic from a commercial rather than a scientific point of view and so increase the volume of traffic that dead and unavoidable expenses per unit will be reduced to the smallest possible average ; (3) Under this latter system some traffic may appear to be overcharged in comparison with other, but in reality it is being carried at a smaller rate than would be the case if the low value traffic were driven from the railway by being called upon to bear an arithmetically exact share of costs equal to that which the higher value traffic could bear without appreciable difference or without its effect being felt.

**Criticism of
Cost of Service
Principle.**

Another system that has its advocates is that of equal mileage rates. It is argued that the charge for conveying one ton of goods or merchandise one mile, or a number of miles, should be equal whatever the direction in which the traffic moves. To a very large extent this is what happens theoretically. It will be recalled that the schedule of charges set in an earlier chapter is based strictly on mileage, but the schedule in no sense imposes equal mileage rates. The charge per mile differs with each class of traffic, and, in addition, it diminishes as distance increases. Probably these departures from strict equality of mileage rates would escape criticism, assuming the critic to be well informed ; but the multiplicity of "exceptional rates," to which reference has already been made, introduces complications, and to these must really be attributed the demand sometimes made for equal mileage rates. In this aspect the subject really becomes one of differential rates, and would perhaps best be dealt with under that heading. For the sake of comprehensiveness in the discussion of the various theories it must briefly be dealt with here. Exceptional rates, it must be remembered, have largely superseded the statutory rates. Railway managers have worked on the principle that wherever traffic could be obtained in sufficient volume to justify it, the

**Equal Mileage
Rates.**

statutory charges should be reduced. Repeatedly traders have pointed out that a market for their goods exists in a particular place but they cannot compete there because other manufacturers are nearer and their cost of transport is consequently lower. Enquiry has shown that if a sufficient volume of paying traffic could be secured to justify the creation of an exceptional rate low enough to admit the distant manufacturer to the desired market, the rate has been granted. Or it may be that the question of competition has not been mentioned or considered at all. Traders in a particular district have asked the railway companies for reduced rates solely on account of the volume or regularity of the traffic ; and in this connection it must be remembered that goods managers are constantly preaching the advantages to be derived from large and constant volume of traffic in enabling them to load their trains economically and reduce costs. Repeatedly they have endeavoured to induce agriculturists to combine their consignments, so that loads might be larger, and the inducements offered have been appreciable reductions in rates. It seems a business-like procedure that they should do so, and from this point of view doubtless no one would condemn it. But it is precisely these reductions that have led to the complaints of the inequality of mileage rates charged.

Exceptional rates have brought on to the railways a large volume of traffic that otherwise could not exist, and have widened the area of trade. If the strict mileage rate, increasing arithmetically with each mile travelled, were the rule much traffic would at once be destroyed, or at most would be carried but a limited distance. Long journeys would only be possible for valuable goods which could bear the weight of the charges ; those of smaller value could not be carried outside their own limited area, or, perhaps, would not be carried at all. Trade would thus become much more localised and centralised than it is ; competition, which we used to be told was the life-blood of commerce and industry, would be restricted, and many a producer would be excluded from markets now open to him solely because exceptional rather than equal mileage rates prevail.

A further suggestion that has been made is that rates should be based on " postal principles," or that there should be zones within which the charges should be the same. The introduction of postal principles would involve one specified charge whatever the distance.

To make it possible the charge would have to be, from the public point of view, so low that no one would feel a grievance ; that the man whose goods were being carried but a short distance would not feel that he was paying more than he ought, while the other man whose merchandise usually travelled far was paying less than he ought. From the point of view of the railway manager the single charge would have to be so high that the great bulk of his traffic was remunerative, and this would at once squeeze out the short distance traffic. Words would be inadequate to describe the storm of protest such a system would produce. The zone suggestion is not altogether impracticable ; indeed, to some extent it already exists. Stations in certain districts, such as some of those in the South Staffordshire Black Country, are grouped together, and from London, say, the rate to each of them is the same, irrespective of the slight difference in distance. The Metropolitan area and some of the ports also constitute these zones. But to apply the principle completely to the whole country would cause difficulties similar to those already mentioned in connection with the postal principles suggestion. The man whose traffic did not go the full length of the zone mileage would feel that he was being unfairly treated in comparison with his competitor (or even a manufacturer in an entirely different and non-competing industry) whose traffic consistently travelled to the full extent of the zone. It would make little difference that the rate he paid was low and not burdensome. The mere fact that he was not getting all he was entitled to would inevitably breed a sense of grievance, or injustice.

What, then, is the principle on which railway managers work in framing rates ? Concisely put, it is known as "charging what the traffic will bear." But this must necessarily be a blend of three things—(1) cost of service ; (2) distance ; and (3) value of the commodity carried.

Usually the third quality is looked upon as the only consideration and consequently charging what the traffic will bear is regarded as unjust. No doubt the attention paid to this aspect of the problem is considerable, but it is obvious that, roughly, cost and mileage cannot be entirely ignored. For instance, it will have been seen, from the tables set out in earlier pages, that class rates invariably increase with distance, whatever the nature of the commodity carried. The

things that vary are the levels at which the charges for the different classes start and the rate of increase in the charge as the distance increases. The starting level gets higher as the classes ascend from 1 to 21, while the rate per mile decreases as the mileage travelled grows greater. Again, it is quite obvious that the question of cost must be taken into consideration; an effort must be made at least to prevent actual loss. The practical railway man may condemn as impossible the contention that rates must uniformly and invariably be based on cost of service; but it is clear that he would be courting financial disaster if he set out to ignore cost altogether. His claim is really that, apart from the difficulties to which reference has already been made, difficulties that make cost of service an impossible basis, he must be allowed greater liberty of action than such a system would give him. He declines to be bound absolutely by either cost or mileage. He has a certain object in view—to keep the system well occupied, on the principle that the greater the turnover the lower the average of dead charges per unit of the thing “produced,” which in his case is transport. It has been seen already that if a railway is to exist at all there is much unavoidable expenditure of money in providing for traffic and in maintaining the service. This preliminary expenditure must be incurred whether the traffic obtained is much or little, and so must the continuing maintenance expenditure except, of course, that while some of it is unavoidable, whatever the volume of traffic, there must necessarily be variations in its extent according to whether the volume is large or small. One of the primary objects, therefore, must be to get traffic and, within limits, the more traffic increases the less will be the cost per unit. The principles have been admirably summarised as follows¹—

I. Get traffic. The more traffic carried the less it costs to carry. Therefore, first and foremost get traffic.

II. Charge no rate so high as to stop the traffic from going : subject to

III. That no rate shall be so low as not to cover the additional cost incurred by the railway in dealing with the traffic to which the rate applies.

It will be seen from this that the phrase “what the traffic will bear” is capable of negative expression, *i.e.*, not to charge what the

¹ *Elements of Railway Economics.* (Acworth.)

traffic will not bear. Sir George Findlay, in his book *The Working and Management of an English Railway*, writing with the experience obtained as the general manager of an English railway, says—

“The rates are governed by the nature and extent of the traffic, the pressure of competition either by water, by a rival route, or by other land carriage, but above all the companies have regard to the commercial value of the commodity and the rate it will bear so as to admit of its being produced and sold in a competing market with a fair margin of profit. The companies each do their best to meet the circumstances of the trade, to develop the resources of their own particular district, and to encourage the competition of markets, primarily, no doubt, in their own interests, but nevertheless greatly to the advantage of the community.”

It is often objected that the system of charging what the traffic will bear is unfair. Traders want uniformity, definiteness and easy applicability of principle. They object to an outside authority assessing them, or at any rate their goods. It is an objection inherent in human nature.

Criticism of the Principle.

Antipathy to the income tax is an example. The taxpayer objects to the assumption that because his income reaches a particular figure therefore he is able to pay a certain rate and a certain amount of tax on it, because no account is taken of varying circumstances which give a varying value to incomes, even when the nominal gross amounts may be the same. It is so in business, the objection being in this case that the market value of a commodity is not necessarily the measure of its value from the point of view of profit, and that as with incomes this value will vary with commodities of equal market price. On the other hand, selling value is the only available guide, rough and ready though it may be.

But whatever arguments may be used against charging what the traffic will bear, the fact remains that it is the system that has received parliamentary sanction in the shape of the General Classification, which, from beginning to end, is nothing else but a huge attempt to frame rates on the “what the traffic will bear” principle. Classification is not a new thing. Parliament and the people interested proceeded on such lines from the earliest canal days. The canal tolls were graded according to the nature of the thing carried. So were the earliest railway classifications, which were modelled very closely on

Parliamentary Sanction of it.

those of the canals. If the latest classification is examined, its whole aim will be found still to be to grade the rates according to value. There are some departures from this idea. The way things are packed when handed to the companies makes a difference. It will be found that an article packed so as to secure convenience of handling, or so as to permit it to be loaded into a truck to the best advantage, without waste of space may be in, say, class I, II, or III, but if not so packed, and consequently a truck will not hold so great a weight, it is in, say, class II, III, or IV—a class higher (and therefore subject to a higher charge) than the class in which it originally appears. The method of packing may not only facilitate handling and loading, but also reduce risk of damage, which again is a reason why it may appear in a lower rated class than otherwise. Still the fact remains that the main object of the classification is to discriminate between commodities according to their value. And therefore, as Parliament has approved the Clearing House classification, Parliament has also approved the principle of charging what the traffic will bear.

The principle has general world-wide application in regard not only to railways but to shipping. In connection with shipping it is a well-

**Principle Applied
to Shipping.**

known fact that at certain seasons, or under certain circumstances, the shipping companies will transport pig-iron and other kinds of iron and steel practically, if not entirely, as ballast; the nature of the general cargo carried makes a quantity of pig-iron, or some such heavy commodity, a most useful thing to have. As bearing on the universality of the application of the principle to railways the following passage from a report of the Inter-State Commerce Commission of the United States may be quoted—

“ It was very early in the history of railroads perceived that, if these agencies of commerce were to accomplish the greatest practicable

**An American
View.**

good, the charges for the transportation of different articles of freight could not be apportioned among such articles by reference to the cost of transporting them severally; for this, if the apportionment of cost were possible, would restrict within very narrow limits the commerce in articles whose bulk or weight was large as compared with their value. On the system of apportioning the charges strictly to cost, some kinds of commerce, which have been useful to the country, and have tended greatly to bring its different sections into more intimate business and social relations, could never have grown to any considerable magnitude, and in some cases could not have existed at all, for the simple reason

that the value at the place of delivery would not equal the purchase price with the transportation added.

"The traffic would thus be precluded, because the charge for carriage would be greater than it could bear. On the other hand, the rates for the carriage of articles, which within small bulk or weight concentrate great value, would, on that system of making them, be absurdly low when compared to the value of the articles, and perhaps not less so when the comparison was with the value of the services in transporting them. It was therefore seen not to be unjust to apportion the whole cost of service among all the articles transported upon a basis that should consider the relative value of the service more than the relative cost of carriage. Such method of apportionment would be best for the country because it would enlarge commerce and extend communication; it would be best for the railroads because it would build up a large business; and it would not be unjust to property owners, who would thus be made to pay in some proportion to the benefit received. Such a system of rate-making would, in principle, approximate taxation; the value of the article carried being the most important element in determining what shall be paid upon it.

"To take each class of freight by itself and measure the reasonableness of charges by reference to the cost of transporting that particular class, though it might seem abstractly just, would neither be practicable for the carriers nor consistent with the public interest. The public interest is best served when the rates are so apportioned as to encourage the largest practicable exchange of products between different sections of our country and with foreign countries; and this can only be done by making value an important consideration, and by placing upon the higher classes of freight some share of the burden that on a relatively equal apportionment, if services alone were considered, would fall upon those of less value. With this method of arranging tariffs little fault is found, and perhaps none at all, by persons who consider the subject from the standpoint of public interest."

Yet another authority¹ may be quoted—

"We hear a good deal said about charging what the traffic will bear; and the man who avows this principle is compared by anti-monopolists with the robber barons of the Middle Ages. He is

Another View. represented as fleecing a helpless public out of all its hard-won earnings. In the proper meaning of the principle the case is just the opposite. Charging what the traffic will bear is a very different thing from charging what the traffic will not bear. It is a hard principle to apply intelligently; but when it is thus applied it adjusts the burdens where they can best be borne, and develops a vast amount of business which could not otherwise exist."

If these opinions should not be regarded as conclusive it will be

Illustrations. well to look at the question from the point of view of its actual working. The rate from Birmingham to London for "crude red iron ore" used to be 8s. 8d.² per ton in

¹ Professor Hadley: *Railway Transportation*.

² In 1914.

4-ton loads, and for gramophones 47s. 6d. per ton. The 8s. 8d. rate was actually less than the class A rates (the lowest provided in the classification approved by Parliament), it being a special rate made by the railway companies. The selling value of the ore then was probably not much if any more than 15s. per ton, but at any rate, it was easily inside £1 per ton. Also the quantity of a ton-weight of ore convertible into metallic iron is appreciably less than a ton so that the railway is carrying something of no value in combination with something of limited value. It is not necessary to know the selling price of a ton of gramophones to be able to appreciate the different value of the two things carried. The rate for ore is probably quite as heavy as that class of traffic will bear, but it is questionable whether the sale of a single gramophone has been prejudiced when the rate was 47s. 6d. plus 100 per cent., plus a flat rate. And from the point of view of the carrying company there is a great difference in the value and cost of the services rendered, though these considerations might almost be ignored when discussing the principle of charging what the traffic will bear. The iron ore rate is merely a haulage rate and does not include any other services. The other rate is a "C. & D.," or collected and delivered, rate. Again, a railway truck will carry a much greater weight of iron ore than of gramophones—five to ten tons of the one compared, probably, with much less than a ton of the other—exactly how much is not very material. Coal is another fine example of things of limited value carried long distances. Plenty of coal, for instance, is carried from the Midland counties to London by rail, and from South Wales to the Midlands. If coal were made to bear a rate composed of the actual working cost, an exact proportion of dead expenses, an exact percentage of profit, at a level charge of so much per mile, it would not get on to the railways at all. It is charged what it will bear. In the case of London, this depends upon a variety of things, the most important, probably, being the competition of sea-borne coal from the north-eastern counties. Midland coal, therefore, bears a rate which is dependent upon its competitive value in the London market. It is a low rate, but it is only a haulage rate, the coal being loaded in trucks belonging either to merchants or to the collieries, and the railway companies do nothing in the way of collecting, loading or delivery. The rate for gold bullion and specie used to be

£10 per ton, but, of course, it never travels in ton lots, being dealt with as parcels. The charge includes special supervision and insurance ; both services not required in the case of such commodities as coal and iron ore. But if ample allowance is made for these things there is still an immense difference in the two sets of charges. Gold therefore pays a good deal more than cost of service plus dead expenses plus percentage of profit, and it can afford to do so. Can it be imagined for one moment that the amount of the charge makes the slightest difference to the quantity of gold sent by train ? The commodities taken for the purpose of illustration are extremes, of course, but they serve the more clearly to bring out the point that large differences in rates do not matter so long as the commodity on which the higher rate is levied is of sufficient value to support the rate ; that it is charged not more than the traffic will bear. There are many other things closer together in value on which different rates are charged, nor is the reason altogether apparent to the superficial observer, but the explanation is that the classification which settles these points of differences has been built up as the result of actual experience in working traffic. It is imperfect, no doubt, as are all things devised empirically on a basis of values which cannot be permanently stable. Business men, no doubt, could furnish many examples of inconsistency in the classification, but on the whole it fulfils the purpose intended, viz. : to get a good paying rate for things of high value and to handle commodities of inferior grade as cheaply as possible. In the main, it is a very good thing for trade generally in that it permits a larger and freer movement than otherwise would be possible. If dead charges were not averaged down in this way there would be a still greater weight of them to fall upon things of high value which possibly might have to bear an even higher rate than they do now.

CHAPTER VI

ALLEGATIONS OF DISCRIMINATION AND EXCESSIVE RATES

THERE is a very widespread and unchanging opinion in the minds of the general public that railway rates in this country are excessive compared with those of other commercial countries of the first rank ; that the companies discriminate unfairly between different districts and sometimes between individuals ; and that foreign imported goods are given preferential rates to the detriment of home products.

Are Railway Rates Excessive ?

Discrimination between individuals need not concern us at all. It is occasionally proved, but it is a very rare offence, prohibited by the legislature, which has rightly provided remedies against it. Discrimination between districts or places when closely examined becomes very largely a question of equal mileage rates, or rather the absence of them. Traders find from experience variations in the rates charged for carrying the same commodity to two places at equal distance, or approximately so, from the point of despatch. Or the rate from two places, again about equally distant, to a common centre is not the same for either place. There are at once complaints that one or other place is being discriminated against to its detriment. As a rule, the explanation is a perfectly reasonable one. In some cases the difference is due to water competition by sea, navigable river, or canal. Traders in the locality which is regarded as having a preference over the other may have available an alternative water route for their goods, and as it is generally conceded that normally water transport is cheaper than land transport, the railway companies find it necessary to frame their rates on a basis which will permit competition with the carriers by water. It is not necessary invariably to cut below the water rates ; something extra may often be charged for the greater speed of delivery, but still the competing influence is there, and if traffic is to be obtained between places favourably situated for water transport it cannot be ignored. Liverpool and London and Hull and London furnish instances of sea competition, and the same thing applies to other ports. The river Severn, in conjunction with the canals inland from Worcester,

furnishes a reason why railway rates from Bristol and the South Wales ports to the western Midlands should be lower than might otherwise be the case. The railway manager argues that he is inflicting no hardship on traders elsewhere when he reduces his rates between places affected by any form of water competition. If his rates were not specially adapted to meet the prevailing circumstances his line would not carry any traffic between those places, but the traffic would go all the same. It would be carried by water probably at a still lower rate than that which the railway charges. The net result would be that both parties would be worse off. The traders who now complain would have to meet competition that is keener to the precise extent of the difference between the land and the water rates. The railway company would lose so much traffic, which, while not yielding the fullest possible margin of profit, is yet profitable, and, moreover, is increasing the profit on all other traffic because it is helping to reduce the average expense per unit of traffic by keeping the line more fully occupied than would be the case otherwise.

Another form of discrimination as between rival places or districts, neither of which enjoys the advantage of water transport, arises from competition between railways themselves.

Geographical Competition. The idea of competition between railway companies is usually derided. It has to be admitted that in many respects there is not free competition. Even that which formerly existed has been enormously reduced first by the "pooling" arrangements under which companies whose areas are the same made working agreements, and, secondly, by the 1921 amalgamations. But notwithstanding there must still remain the competition which arises from geographical causes, if from no other. Assume two towns, A and B, directly connected by rail and having also an indirect connection by another line. Assume also that on this second line there is a town C. Diagrammatically the position may be illustrated as shown on the next page.

The company with the direct route between A and B has its maximum scale charge fixed by Act of Parliament and is unable to exceed this scale, though it may reduce its rates as much below the scale as its governing officials consider expedient. It has already been seen that whatever is the rate for the direct journey cannot be exceeded by the longer indirect line through C. The company

having the connection *via* C finds it worth while to come down to the level of the rate for the shorter direct route and does so. At C, however, there is no competition, so the scale rates are adhered to, and the rate from A to B *via* C is little if any more, perhaps less, than the rate from C to B. The trader at C often regards this as a grievance. He argues that if merchandise can be carried the whole way from A to B through C at a rate which works out at, say, $2\frac{1}{2}$ d. per mile while his rate is, say, 3d. per mile, therefore he is being discriminated against to the advantage of his competitors



at A. But if the worst possible construction is put on the facts as they exist, is he any the worse off? He is not being charged more than the legal rate and the through traffic, on the principle laid down, is performing a useful service. If there were not through traffic he would still be paying the same rate, and it is quite conceivable that by means of the through traffic the prospects of his obtaining a reduced rate are much greater than they would be if it did not exist. On the whole, therefore, the arrangement may be described as a purely business one, and the question of unfair discrimination may be dismissed as untenable.

What has become one of the standard illustrations of, and arguments in support of, this particular phase of railway policy is taken from Hadley's *Railroad Transportation: Its History and its Laws*. As it deals with actual experience rather than theoretical argument it is worth quoting at length—

“On the coast of Delaware a few years ago there was a place which we shall call X, well suited for oyster-growing, but which sent very few oysters to market because the railway rates were so high as to leave no margin of profit. The local oyster-growers represented to the railroad that if the rates were brought down to one dollar per 100 lb. the business would become profitable, and the railroad could be sure of regular shipments at that price. The railroad men looked into the matter. They found that the price of oysters in the Philadelphia market was such that the local oystermen could pay one dollar per 100 lb. to the railroad and still have a fair profit left. If the road tried to charge more, it would so cut down the profit as to leave the men no inducement

An American Illustration.

to enter the business. That is, these oysters would bear a rate of one dollar per 100 lb. and no more. Further, the railroad men found that if they could get every day a car-load, or nearly a car-load, at this rate it would more than cover the expense of hauling an extra car by quick train back and forth every day, with the incidental expenses of interest and repairs. So they put the car on and were disappointed to find that the local oyster growers could only furnish oysters enough to fill the car half full. The expense to the road of running it half full was almost as great as running it full: the income was reduced one-half. They could not make up by raising the rates, for these were as high as the traffic would bear. They could not increase their business much by lowering rates. The difficulty was not the price charged, but the capacity of the local business. It seemed as if this special service must be abandoned.

"One possibility suggested itself. Some distance beyond X, the terminus of this railroad, was another oyster-growing place, Y, which sent the oysters to market by another route. The supply at Y was very much greater than at X. The people at Y were paying one dollar per 100 lb. to send their oysters to market. It would hardly cost 25 cents to send them from Y to X. If the railroad from it to Philadelphia charged but 75 cents per 100 lb. on oysters which came from Y, it could easily fill its car full. This was what they did. They then had half a car-load of oysters grown at X on which they charged a dollar, and half a car-load from Y, on which they charged 75 cents for exactly the same service.

"Of course, there was a grand outcry at X. Their trade was discriminated against in the worst possible way—so they said—and they complained to the railroad. But the railroad men fell back on the logic of facts. The points were as follows: (1) a whole car-load at 75 cents would not pay expenses of handling and moving; (2) at higher rates than 75 cents they could not get a whole car-load but only half a car-load, and half a car-load at one dollar (the highest charge the article would bear) would not pay expenses. Therefore, (3) on any uniform rate for everybody the road must lose money, and (4) they would either be compelled to take the oyster-car away altogether or else get what they could at a dollar and fill up at 75 cents. There was no escape from this reasoning, and the oystermen at X chose to pay the higher rate rather than lose the service altogether."

It would be difficult to find a clearer example than this of the cause of what at first sight might look like most unfair discrimination. Here is a case where the trader at the intermediate point is not merely not worse off because of an even lower through rate than he pays, but, on the contrary, is distinctly benefited by the through rate against which he first protested as the worst possible kind of discrimination. And, though this aspect of the subject is not under consideration, the example may also be used as an illustration of the results which follow from charging what the traffic will bear. By following this latter principle a useful service is maintained,

whereas equal mileage rates or even equality of rates would inevitably entail the abandonment of the service.

The amalgamations that took place under the 1921 Act have upset the example quoted from the late Sir Wm. M. Acworth's

Elements of Railway Economics, which appeared
An English Illustration. in the earlier editions of this book. The Great

Eastern and the Great Northern railways no longer exist as separate entities, being now combined in the London and North Eastern, but the example was such an excellent illustration of the conditions formerly prevailing, that it is still worth reproducing as an abstract statement of principle by one who was such an acknowledged authority on the subject—

“ By the Great Eastern Railway, which goes in an almost direct line, Yarmouth is 121 miles, Norwich is 114 miles, and Cromer is 138 miles from London. But there is another route *via* the Great Northern from King's Cross which, passing Peterborough, 76 miles, and Lynn, 115 miles, turns east along the north coast of Norfolk and reaches Cromer in 160 miles, Norwich in 167 miles, Yarmouth in 187 miles. And not only is this latter route a great deal longer to Cromer and very much longer to Norwich and Yarmouth, but all along its course from Lynn on the west to Cromer on the east, it is cut by the direct Great Eastern lines from London. The result is inevitable. Unless the Great Northern route goes out of the through business altogether, agreeing not to compete (probably being given a *quid pro quo* by the Great Eastern elsewhere) its possible rates for London traffic are fixed for it. Their highest point will be somewhere near Cromer, based on the Great Eastern London-Cromer distance, and they will fall westwards towards Lynn and southwards towards Norwich and Yarmouth. In other words, no additional charge will be made for carrying the traffic the last fifty miles of its journey to Yarmouth. But this applies to London only. Intermediate places on the Great Northern, say Hatfield or Hitchin, have not the Great Eastern route available. They must send their traffic—goods, not passengers, for passengers can route themselves by breaking the journey at Cambridge—by the Great Northern circuitous route. For such traffic the rates, we may assume, will rise on a normal mileage basis, and therefore from Hitchin to Yarmouth, 155 miles, the rates will be considerably higher than if the railway company had received the traffic in London and had had to carry it 32 additional miles before it reached Hitchin.

“ We may assume that, if a trader at Hitchin happened to discover this, he will be indignant. Certainly on the face of it, he appears to be badly treated. But is it so in reality? Are there any special circumstances entitling him to be charged less than the normal mileage rate? If not, he cannot complain; he is only charged on actual distance. Is the Yarmouth traffic carried at his expense? No. For we have seen that, even with rates far below the average, it is yet more profitable to the railway to carry traffic than to lose it altogether. Is the Great Northern Company enabling the London trader

to obtain an undue advantage over his competitor at Hatfield or Hitchin? Again, no! The London trader has access to the short and direct route. There is no reason why he should pay any more than the rates natural to that route. Hitchin's only route to Yarmouth is a circuitous one. This may be Hitchin's misfortune, but it is not the fault either of the London trader or of the railway company. On the whole, there seems no reason to doubt that the railway company is enabled to carry traffic past Hitchin to London for considerably less than nothing."

There we may leave the question of discrimination as between districts. It is a question, like most others connected with railway working, from which it is extremely difficult to exclude controversial, or what may be regarded as partisan, methods of description and illustration; but the variety of the instances given should be an answer to such criticisms and should be conclusive evidence that, hard as the case may be of the man who is in the position of the Hitchin trader, the real disadvantage he suffers is a geographical one, or a fortuitous one arising from the circumstances under which the railways of the country were laid out. And this treatment is not due to any desire to discriminate, or even to accidental discrimination, but to a clearly defined and well established principle of railway economics.

Complaints that English rates are excessive compared with those made by the railways of foreign countries are not usually based upon exactly comparable conditions. Before comparison can be made it is necessary to enquire minutely, so that it may be certain that like is being compared with like. Frequently it will be found that the rates compared to the disadvantage of the British charges do not represent anything like the same conditions. As a rule, the British rates used in controversy include not only haulage but collection and delivery and other terminal services, whereas the foreign rate with which comparison is made includes nothing beyond the haulage. An agency other than the railway company arranges for collection and delivery, and performs most if not all the terminal services. Again, in most European countries with sufficiently efficient railways to furnish anything in the nature of a comparison there are two classes of service known as *grand vitesse* and *petite vitesse*. The *grand vitesse* about compares with the British service; the *petite vitesse* is slower, and the rate charged is correspondingly lower. It will be found that some of the comparisons made are

Difficulties of the Position.

English and Foreign Rates.

between the *grand vitesse* of the British service and the *petite vitesse* of the continental.

By far the most important source of international disparity, however, arises out of the difference in origin and ownership. Most of

**Source of
International
Disparity.**

the European railways are either State-owned or State-subsidised directly or indirectly. In France, for instance, the Government has provided land, constructed permanent way, built stations and leased all this to companies who have only had to lay the rails and provide the rolling stock. In addition, the French Government has given other financial assistance and has guaranteed interest. From the point of view of the railways this has its advantages and disadvantages. Among the advantages may be reckoned the guarantee of interest and the smaller capital outlay with its consequent superiority of dividend earning power. Among the disadvantages is the control exercised by the State over rates and charges. There is similar control in this country but not to the same extent. Here a railway manager cannot increase a rate without the sanction of the powers that be. In France rates cannot be reduced without the approval of the Minister of Public Works. And reductions of rates usually imply sacrifices on the part of the consignor: longer time for delivery, so that trucks may be better loaded, minimum quantities must be paid for whether the consignment is as much as the minimum or not, and the liability in respect of delay or damage is reduced. The railway manager also has to submit to the manipulation of his rates so as to favour national commercial interests. And frequently these interests are summed up in the framing of specially low export rates. It will be seen from this brief summary that the essential conditions on which comparisons may be safely based are extremely different in the two countries.

As soon as the antipathy with which they were originally regarded had passed away Prussia came to the conclusion that the railways would be better publicly than privately owned, but

German Railways.

at the outset the difficulty of raising the money stood in the way of this policy being carried out. Concessions were granted with a guarantee of interest, the power of State purchase being retained. Other German kingdoms and dukedoms adopted State ownership from the outset. Later Prussia built

strategical railways for military purposes, and later still, under Bismarck, by purchase obtained control of all the main lines of North Germany whether within the boundaries of the kingdom or not. Military reasons were not the only ones for this policy ; it also had in view the furtherance of the national fiscal policy, particularly by means of low export rates and the prohibition of low import rates. The experience of traders is summed up in the sentence—

“Traders engaged in export business have gained very material advantages by the concession to them of exceptionally low export rates, while traders who do an exclusively home business are worse off under a State than they would have been under a company regime.”¹

In Holland much financial assistance has been given by the State. Belgium owns practically the whole of her railways and for many years operated them with two objects in view :
Other Continental Railways. the affording of cheap transport generally, even though this may entail a burden on the taxpayers, and the feeding of the port of Antwerp. Finally, Belgium has had to abandon State operation, as mentioned in an earlier chapter. Denmark has both built and subsidised railways. The main object having been to furnish cheap transport, the question of a profitable return on the capital expenditure has been quite secondary.

As far as Europe is concerned, it is apparent that there can be no possible comparison with the conditions which characterise British railways. In all the countries with which comparisons are generally made there are circumstances, the influence of which, on railway rates, cannot be estimated. Broadly stated, the effect is to subsidise the traders who use the railways at a greater or smaller expense to the State, and the product is a system which, at a moderate estimate, cannot be described as more efficient than the British. What would the conditions be here if our railways had received this State help ? The question cannot be answered, of course. But it is not inappropriate to contrast, briefly, their experience with what has been written of the Continent. They have had neither subsidy, nor guarantee of interest. They have had to pay in many instances excessive prices for the land they have taken. They have had to pay grossly extravagant Parliamentary costs when promoting

Difficulties of Comparison.

¹ Pratt : *Railways and their Rates.*

the Bills sanctioning their enterprise. They have been put to great expense by the various Parliamentary and Royal Commission enquiries that have been held ; enquiries that seem almost as numerous as blackberries in autumn. They have had to conform to Parliamentary requirements in constructing their track and providing its equipment, both stationary and moving. They have had to submit to Parliamentary regulation of their rates and fares, and the hours of labour and wages of some of their servants.

There is yet another country with which comparison is made—the United States. In both countries the new method of locomotion

**United States
Railways.**

was introduced at about the same time ; but whilst the United Kingdom was settling the larger portion of the United States was unoccupied and undeveloped. Population was concentrated on the Atlantic and Pacific coasts (principally the former) and on the great rivers. New settlers turned their faces westward to a new Land of Promise, where Nature had lavished rich bounties and the hand of man had not been stretched out to claim them. Pioneers had pushed their trails out to these virgin lands and had begun to realise their possibilities. To them a railway was essential. It meant the softening of the rigours of pioneer life, more effective protection from marauding Indians ; and, above all, an outlet for the surplus products of their lands. They were glad to get a railway at any price, and “ at any price ” did not mean the exorbitant outlay of capital. It meant the giving of land freely for the track, and the acceptance of economical construction and conditions generally such as Parliament made impossible here. What mattered it if the track was of a kind which the British Government would have regarded as unstable, or if the system of signalling and controlling moving trains was imperfect, even almost non-existent in some cases ? The *trains* were what they wanted, and having got them they were content to run the risk of derailments, collisions and the running down of live stock and human beings. The essential point to be remembered, however, is that construction was cheap, and further that not only was land for the track given freely, but also large tracts of land on either side of the line were allotted to the railway companies for sale to settlers so that the companies might reap some of the benefit which flowed from the risk they had incurred in

opening up the country. Professor Hadley¹ assumed that the average cost of construction of American railways was \$45,000 (£9,375) per mile, and the average cost for the whole of Europe at the time he wrote (1885) was \$115,000 (£23,958) per mile. Against these sums he contrasts the following which showed the average cost per mile of line open in the United Kingdom :—1863, £32,804 ; 1872, £36,000 ; 1874, £37,000 ; 1876, £39,000 ; 1878, £40,000 ; 1881, £41,000 ; 1883, £42,000.

This question of the cost of construction is an exceedingly difficult one to unravel and consequently the estimates as to its amount have varied with different authors. Writing in 1905, the late Sir Wm. M. Acworth put the cost of constructing the railway proper (*i.e.*, road and buildings) of the United Kingdom at a round figure of £800,000,000, which worked out at about £36,400 per mile of line open at that time, and £21,000 per mile of single track. Using the " Bulletin of the International Railway Congress Association " for Feb., 1911, as his authority, Mr. Edwin A. Pratt² gives the cost per mile at £55,712. From the same source he gives the following corresponding figures (per mile in each case) for the countries to which reference has previously been made—

Germany	£22,821	Denmark	£10,884
France	£28,611	United States of America .	£15,071
Belgium	£37,088	Canada	£12,022
Netherlands	£17,350		

The figures may not be minutely accurate, and it is to be regretted that they cannot be brought right up to date, but probably it will be safe to assume that their relationship is sufficiently good to afford a fair standard of comparison. In any case, however, it must be sufficiently clear that cost of construction in this country has been immensely greater than that of any other country with which useful comparison of rates can be made. Heavier cost of construction, of course, means a larger outlay of capital on which either interest or dividends must be paid ; and it should not need to be pointed out that these things stand in the way of reductions of railway rates. Obviously, if railways are well managed the lighter the capital charges the greater the possibility of profitable working and the lower the rates that need to be charged to secure a profit.

¹ *Railroad Transportation.*

² *History of Inland Transport.*

Other reasons than the difference in capital charges (differences in the nature of the services) have been pointed out in connection with European countries. Differences of quite another type are met with in connection with the United States. America is a country of longer distances and greater population than the United Kingdom ;

**Special
Circumstances
of the
United States.**

and in addition as regards agricultural products of much greater export trade. These things in combination give the railway manager of the United States an immense advantage in handling freight economically. Take the case of grain only.

Large quantities from the surrounding country are concentrated in elevators at convenient centres, and from these are transported to the port of shipment. The trains are exceptionally large ones, they carry thousands of bushels of grain, and from a place such as Buffalo they run straight through to New York, a distance of 440 miles, without a break. The trains are loaded mechanically from the elevators and discharged mechanically into the shipping in New York harbour. Thus terminal charges are reduced to a minimum and they are spread over hundreds of miles so that the average addition per mile to each ton of produce carried becomes infinitesimal. Almost similar illustrations of the method of dealing with other forms of agricultural produce could be cited, but doubtless sufficient has been said in explanation of the manner in which such low average rates per ton per mile are shown by United States statistics.

Quite a superficial knowledge of British railways is sufficient to show that apart from the capital burdens they have to bear,

**British
Peculiarities.**

their task is quite a different one. They have neither the distances to haul nor the quantities to handle. Big, fully-loaded, trains are possible when

they are dealing with imports such as foreign meat and with minerals, but taking the home trade generally it runs in much smaller quantities, so small that it has been described as "retail" business. In 1903 Lord Stalbridge, a former chairman of the London and North Western Railway Company, stated that while the largest consignment of coal amounted to nearly 1,000 tons the average was only $17\frac{1}{2}$ tons, 80 per cent. of the consignments were less than 20 tons, and some were as small as $2\frac{1}{2}$ tons. It has been stated concerning general merchandise, that less than sixteen years ago,¹ on the

¹ Written in 1914.

Great Eastern Railway, 90 per cent. of the consignments were of 1 ton or less and 70 per cent. were of 3 cwt. or less. Much may have happened in the years which have elapsed since these calculations were published. During the whole of the period the constant effort of the railway managers has been to promote better loading of goods trains with the object of reducing the number of trains and the goods train mileage. Some success has resulted from these efforts. But, on the other hand, the tendency of modern business has been against them. It has become more and more the custom of business men, whether wholesalers or retailers, to work with the smallest possible stock and to order small quantities more frequently as goods are required. This tendency has to be set against the efforts of the railway managers, so that quite probably the figures which were accurate two decades ago are sufficiently so now to illustrate the point that while the railways of the United States are handling immense quantities and carrying them distances which are geographically impossible here, British railway managers are mostly concerned with what comparatively may be described as trivial quantities hauled for a few score miles at most.

When all this is demonstrated, however, are the results so hopeless, so severe a handicap to the British trader as is often made out?

**Is the British
Trader
Handicapped?**

There is no evidence to suggest that there is any equality between United States and British rates for long hauls, though it may be so in connection with some of the British rates for large quantities of imported goods such as the special meat trains from Liverpool to London. But British railway managers and other authorities have seriously questioned whether the American rates for small quantities carried short distances are any lower than, if as low as, the corresponding British rates. In 1902 there were letters in *The Times* on the subject from Sir Geo. S. Gibb (then Mr. Gibb, and manager of the then North Eastern Railway Company) and Mr. M. B. Wied, of the Baltimore and Ohio Railroad. The details of the correspondence cannot be given, but Sir George Gibb asserted that "for the quantities in which English traders actually consign their traffic and for usual English distances, English rates are lower than American," and he supported his statement with figures. Mr. Wied, on the other hand, denied the assertion, and also produced figures in support of his views. The late

Sir W. M. Acworth subsequently joined in the controversy with the statement :—" As for America, where, if anywhere, average rates are low, Mr. Gibb has recently shown to demonstration in your columns that rates for small consignments—the only rates affecting the English small farmer—are much higher in the States than in England." A few years ago an elaborate comparison of United States and Caledonian rates was made by the officials of the Caledonian Railway Company, which showed very conclusively that British rates were lower than American for distances up to about 50 miles and higher for longer journeys. The point of all this evidence, of course, is that the exceptionally low ton-mile rates of America are averages which have little real relationship to the actual rates paid ; that they cover rates which are actually heavier as well as lighter than British rates ; and that while in this country geographical limitations and conditions of trade are such that it is impossible to produce such low averages, the trader here actually pays less instead of more than his American competitor for his "retail" consignments. Averaged in another way, the comparison between this country and the United States is not unfavourable. Below is a table giving United States and United Kingdom figures for 1924—

	U.S.A. 1924	Great Britain 1924
Tons carried	2,171,718,705	335,496,900
Receipts	£893,130,102	£106,402,136
Average receipts per ton	8s. 2½d.	6s. 3d.
Average receipts per ton mile	1·116 cents	1·419d.
Average haul per ton	173 miles	52·97 miles

The immense differences in quantities and earnings are impressive, but the main object in setting out the figures is to show the average receipt per ton carried. In the United States in the year taken the average receipt per ton per mile works out as low as 1·115 cents or a little over ½d. per mile against nearly 1½d. in this country. And yet the average receipt per ton carried comes out at 8s. 2½d. against 6s. 3d. for Great Britain. The figures, of course, are averages, but still there is the fact that on the average the cost of transport in the

**Heavier Cost
in U.S.A.**

United States amounts to 1s. 11½d. per ton more than that which has to be paid in this country. There is no contradiction between these figures and the American ton-mile rate, and no reflection on the efficiency of American railways. What it means is that the distances there are so much greater than they are here, and on the average a ton of minerals or merchandise travels so much farther that, notwithstanding an unequalled ton-mile rate, the cost of transport mounts up mile by mile until, in the end, it is more than the corresponding cost in this country. Put in still another way it means that in this country the average addition to the delivered or free on board cost of an article, due to the necessary expense of transport, is still appreciably less, notwithstanding the large increases that have been made here, than the corresponding addition due to the same cause in America. It follows, therefore that, notwithstanding the complaints of excessive rates, cost of transport is not here the burden that it is in America, because the goods transported do not have to travel so far.

CHAPTER VII

THE QUESTION OF FOREIGN PREFERENCE

CONSIDERATION of the question whether British railways give preferential rates for the carriage of foreign imported produce brings us once again on to controversial ground, and it is difficult to avoid at least the appearance of partisanship. It is necessary, however, to examine the subject ; not for the sake of proving that either the traders who complain, or the railway companies who make the rates, are wrong ; but because in the examination there are interesting points in railway economics ; points to which repeated reference has been made in earlier pages, are again illustrated. As a preliminary it is well to set out the law on the subject. The Railway and Canal Traffic Act of 1854, in section 2 laid it down that—

**Preferential
Rates.**

“ Every railway company, canal company, and railway and canal company, shall, according to their respective powers afford all reasonable facilities for . . . traffic . . . and no such company shall make or give any undue or unreasonable preference or advantage to, or in favour of, any particular person or company, or any particular description of traffic in any respect whatsoever, nor shall any such company subject any particular person, or company, or any particular description of traffic to any undue or unreasonable prejudice or disadvantage in any respect whatsoever. . . . ”

**Railway and
Canal Traffic
Act, 1854.**

Again, section 27 of the Railway and Canal Traffic Act, 1888 says—

“ (1) Whenever it is shown that any railway company charge one trader or class of traders, or the traders in any district, lower tolls, rates, or charges for the same or similar merchandise or lower tolls, rates, or charges for the same or similar services than they charge to other traders, or classes of traders, or to the traders in another district, or make any difference in treatment in respect of any such trader or traders, the burden of proving that such lower charge or difference in treatment does not amount to an undue preference shall lie on the railway company.

**Railway and
Canal Traffic
Act, 1888.**

“ (2) In deciding whether a lower charge or difference in treatment does or does not amount to an undue preference, the Court having jurisdiction in the matter, or the Commissioners [*i.e.*, the Railway and Canal Commissioners] as the case may be, may so far as they think reasonable, in addition to any other considerations affecting the case, take into

consideration whether such lower charge or difference in treatment is necessary for the purpose of securing in the interests of the public the traffic in respect of which it is made, and whether the inequality cannot be removed without unduly reducing the rates charged to the complainant : Provided that no railway company shall make nor shall the Court or the Commissioners sanction any difference in the tolls, rates, or charges made for, or any difference in the treatment of, home and foreign merchandise in respect of the same or similar services.

" (3) The Court or the Commissioners shall have power to direct that no higher charge shall be made to any person for services in respect of merchandise carried over a less distance than is made to any other person for similar services in respect of the like description and quantity of merchandise carried over a greater distance on the same railway."

There are one or two important points to notice in connection with these enactments. First of all in the Act of 1854 it is necessary to

**Comparison
of Acts.**

remember that the words used are "*reasonable facilities*," and "*undue or unreasonable preference or advantage*." Preference or advantage, as such, are not prohibited ; the legislature only steps in when either of these qualities of a rate or toll become "*undue*" or "*unreasonable*." The same words, "*undue preference*," occur again in the first sub-section of section 27 of the Act of 1888. Sub-section 2 of the same Act goes still farther, even to the extent of authorising the legal authorities to consider questions of public interest in deciding whether a preference is "*undue*" or not. It also says that there shall be no difference in treatment for the same or similar services whether the merchandise is of home or of foreign origin. It is abundantly clear from these passages that the legislature deliberately gave the railway companies considerable freedom to frame their rates according to the requirements of trade. The only things prohibited are preferential rates when the services rendered are exactly similar. Keeping these facts in mind, it is well to examine some typical complaints that preference is given in the rates at which foreign imported produce is carried.

The complaints may be roughly divided into two classes : (1) those which compare a continental through rate to some place in this

**Nature of
Complaints.**

country with the corresponding British rate for the reverse journey ; (2) those which compare an English rate for imported goods from the port of disembarkation to an inland centre with rates charged for British produce carried over the same line in the same direction, often for shorter distances.

Taking first the through rates from abroad, it is necessary to recall what has already been said as to the steps taken by the governments of European countries to foster the development of their ports and their export trade. It is on record in a Foreign Office report (Cd. 8,720 of 1898), fuller extracts from which are given in the Appendix, that the railways of Austria-Hungary at that time gave a reduction of 10 per cent. on rates on sugar and 15 per cent. on iron and steel intended for export. Belgium had made "very great reductions" in export rates. Denmark subsidised a steamship line so that a reduction of 20 per cent. might be made in the rates for exported agricultural produce. Germany granted special rates to her North Sea ports with the result that the report says in commenting on a tabular statement: "It will be seen that the local rates are 200 per cent. higher per kilometre than the preferential rates to North Sea ports." Finally, it is on record that France also grants specially reduced rates on domestic products sent to the coast for export.

Conversely it has to be remembered that while this exceptional treatment is given to outgoing produce it is not extended to that which is imported. The imports are not particularly welcomed—therefore the rates are not lowered to facilitate their competition with home industries.

This is illustrated by a sentence in a letter from a former British Consul in Germany, also given at greater length in the Appendix: "Thus German coal from Silesia to Stettin pays from 74 to 77 pfgs. per 100 kilos; British coal from Stettin to Silesia pays 106 to 110 pfgs."

When conditions such as these prevail, it is easily understood that many through rates from the Continent to England, lower than those from England to the Continent, might be quoted if the trouble were taken to collect them. It is true that British railways also quote exceptionally low rates for goods intended for export from this country as compared with the rates charged, even to a seaport, when the goods are intended for home consumption; but under the "same or similar services" clause, whatever rate is put on the books for export should also be available for import between the two particular points to which it applies. This exceptional treatment, of course, is beneficial to exporters, but it cuts both ways.

**Through Rates
from Abroad.**

**Exceptional
Treatment.**

**Lower Export
Rates.**

In some cases other influences than the lower continental special export rates affect the charges for goods imported into England. An

example of this was furnished some time ago by **Import Rates.** means of a rate for spelter from Stettin to Birmingham. For 10 ton lots this, at that time, was 16s. 6d. per ton, and the corresponding rate from Birmingham to Stettin was given as 23s. 5d. per ton. The firm of Birmingham merchants who furnished this comparison regarded it as conclusively proving preferential treatment especially as the German forwarding agents who quoted the 16s. 6d. through rate also quoted 6s. per ton for transport from Stettin to Hull. The inference was drawn that 6s. was the sea freight and consequently the amount remaining for railway carriage from Hull to Birmingham was 10s. 6d. per ton. As compared with 11s. 4d. per ton, which was the rate then charged by British railways for 10 ton lots of spelter from Birmingham to Hull, there was apparently a preference of 10d. per ton in favour of the foreign articles on the railway journey alone. Enquiry, however, proved the inference to be inaccurate. North of England shipowners of repute definitely assured the enquirer that a railway preference was not given, but that the portion of the 16s. 6d. through rate paid for the land journey from Hull to Birmingham was 11s. 4d. per ton, or exactly the same as the rate for British spelter from Birmingham to Hull. The allegation of preference, therefore, fell to the ground. The sea freight from Stettin to Hull was thus reduced to 5s. 2d. per ton. It may be asked : " Why is it that the sea freight from Stettin to Hull is 5s. 2d. whereas the rate quoted from Birmingham to Stettin showed, after deducting 11s. 4d. railway rate from Birmingham to Hull, a balance of 12s. 1d. for sea freight ? " The difference must clearly be outside any question of malevolent railway influence, and an explanation is not essential to the object in view ; but it may be stated that the difference, as may be inferred, was entirely due to shipping policy. Spelter from Stettin was in competition with the same metal produced on the borders of Belgium and Germany which came by way of Antwerp to Harwich and then inland. If the shipping company trading from North German ports in the Baltic was to carry any spelter to England the rate must be such as would compete with that for the shorter journey from Antwerp. Hence the " cut " in rates. But there were no such considerations affecting the reverse journey and the normal

rate was charged. What, therefore, at the outset looked like a clear case of preference given by the railway companies turned out to be a matter entirely within the region of shipping policy, or economics, whichever term is preferred.

The influence of continental export rates is clearly seen in the following example of "preference" which has been quoted: Iron

Influence of Continental Rates. bars and sheets, Charleroi to Birmingham, 21s. 10d. per ton, from Birmingham to Charleroi, 24s. per ton.

When the example was investigated it was found that the British railway rate for 10 ton lots of bars and sheets between Birmingham and Hull or Harwich in either direction was 12s. 6d. per ton, whether the material was British or foreign. The difference between the two through rates quoted (2s. 2d. per ton) must therefore occur outside the borders of the United Kingdom and in view of the known circumstances of general application, the reasonable inference is that it is due entirely to the special continental export rates.

A similar example quoted concerned machinery in parts consigned from Chemnitz to Birmingham at 64s. per ton, whereas the rate for the same things from Birmingham to Hull was 26s. 3d. And it was pointed out that while the Chemnitz-Birmingham rate averaged 0.98d. per ton per mile the Birmingham-Hull rate averaged 2.4d. per ton per mile. At the time of enquiry, however, it was stated that again the rate of 26s. 3d. applied between Birmingham and Hull irrespective of the direction or the origin of the machinery conveyed, and that the whole difference lay outside this country. The through rate from Chemnitz to Birmingham, to represent the conditions accurately, should have been stated as follows: Chemnitz to Hull, ton-mile rate, 0.69d. ; from Hull to Birmingham for the remainder of the journey, 2.4d.

The fact appears to be that although these and similar examples are publicly produced as evidence that the British railway companies

Neglect of Real Causes of Difference. grant preferential through rates on imported foreign produce, the people who make the complaints have been content to accept the figures as they find them, ignoring the evidence as to continental railway policy and making no enquiry as to the real causes of the difference. The most surprising thing was that if the circumstances alleged were really believed they were not made the subject of complaint to the Railway

and Canal Commissioners who had absolute power to deal with them under the law already quoted.

More easy to examine are the complaints that fall under the second division—those based on comparisons of British rates for imported

**Comparison of
Home Rates.**

goods from the port of entry to an inland centre, with the rates charged for home produce carried over the same line for the same or even a shorter distance. Many have been made from which a selection may be given. The Scottish Chamber of Agriculture once complained to the Board of Agriculture that while 70s. per ton was charged for 20 ton lots of British meat from Haddington to London the rate for similar quantities of foreign meat from Glasgow to London was 45s. per ton. It was found that the 45s. rate was an exceptionally low one, adopted to meet shipping competition. Fresh meat could be sent in 20-ton lots from Glasgow to Grangemouth by rail, and thence by sea to London for 39s. 2d. per ton, and the railways concerned made the 45s. rate with the object of obtaining this traffic. But as far as Glasgow was concerned there was no preference to the foreign meat because, once the 45s. rate for 20-ton lots had been entered in the railway rate books as required by law, it was available for all and sundry consignors indiscriminately and irrespective of whether they were consigning 20 tons of foreign or Scottish meat. But there is yet another fact which disposes of the suggestion of preferential treatment. If Haddington were on the route from Glasgow to London there would have been more reason for the complaint, though it would not have been entirely justified; but Haddington is on the east coast and Glasgow more to the west of Scotland—virtually on the west coast as far as shipping competition is concerned. The circumstances, therefore, are not parallel. If there were ground for complaint it is that mileage rates are not equal; but we have seen that this principle of charging is impracticable.

A much more common, in fact a standard, illustration of preference was that of meat carried from Liverpool to London at 25s. per ton, while from Cheshire stations the rate was 40s. per ton. In the first place it, needs again to be noticed that the 25s. rate from Liverpool applies equally to foreign or English meat so long as the specified tonnage per consignment (which happens to be 3 tons) is maintained. That

**London Meat
Traffic.**

disposed of the charge of preferential treatment as far as Liverpool itself was concerned ; but larger issues than this were opened up. The foreign meat traffic from Liverpool and Birkenhead is enormous. Both the London, Midland and Scottish (from Liverpool) and the Great Western (from Birkenhead) ran at least one special meat train to London each day and sometimes two or three trains, and the London, Midland and Scottish has sent four. They were large trains, each van was loaded to its full capacity varying with the nature of the meat (fresh, frozen or chilled), and once made up they ran straight through to London without stoppage or shunting except such as arise from the exigences of the service as a whole. There was no crawling from station to station to pick up a succession of partly-loaded trucks. Consequently the expense of running these special trains was reduced to a minimum, and though it may possibly happen that the rate per ton was barely profitable, yet the tonnage handled was so great that this, combined with the reduced expense, made a train load of meat a very profitable thing, especially when it is remembered that the large quantity dealt with profitably helps so greatly to reduce the average of dead expenses per unit, a point which has already been dealt with at length.

Somewhat similar circumstances were under review in what has become known as "the Southampton case," brought through the instrumentality of the Mansion House Association against the old London and South Western Railway Company. It was alleged that—

"quantities of foreign hops, fresh meat, lard, butter, bacon, and cheese arriving at Southampton docks and sent by through train to London were unduly preferred over similar home produce. It was proved that the foreign produce was in large packages and full train loads, whereas the home produce was delivered in small quantities badly packed and picked up in small consignments at various stations. It was held that the difference of treatment did not amount to undue preference merely because the merchandise was foreign."¹

The case is important in that it enabled the Railway and Canal Commission to give a clear decision that mere difference in the

"Undue " rates charged did not constitute undue prefer-
Preference. ence, and that a railway company is entitled to take into consideration when framing a rate the nature and volume of the traffic for which it is quoting special terms. The

¹ Evidence of Mr. W. H. Macnamara, Registrar of the Railway and Canal Commission, before the Royal Commission on Railways appointed in 1913.

governing conditions in all these questions are that the preference must not be "undue," and that there must be no difference in treatment for "the same or similar services." As a result of this case some interesting and illuminating figures were given to the public. The London and South Western Company showed that a train load of bacon or the like produce loaded at the docks and sent through to London at 6s. per ton, earned 12s. 6d. per mile (total distance, 78 miles), and after allowing 2s. 6d. per mile for working expenses there remained a profit of 10s. per mile. The rates charged for the uncertain "retail" local traffic averaged 15s. per ton for the same distance, but a train only earned 5s. per mile, and after again deducting 2s. 6d. per mile for expenses (which would be an under-estimate if the same figure had any exact application to the foreign through traffic) there remained a profit of only 2s. 6d. per mile. Obviously if the local rates were reduced to the 12s. 6d. level there would be no profit on the business until such time as it was enormously stimulated, developed and organised, if ever that time arrived.

The sentimental aspect of these questions is always one that makes a strong appeal. The idea that a British railway company is dealing with foreign produce on better terms than it fixes for that of home origin outrages patriotic sentiment and secures unbounded sympathy for the supposed sufferers, but it will be found that in the large majority of cases alleged, if the "preferential" railway traffic were stopped at once, the goods would still reach the same destination by the all-water route, instead of partly by water and partly by rail, and the competition which the British producer has to meet would not be diminished, but more probably intensified.

**Sentimental
Aspect of
the Question.**

One other example may be referred to. The rate for imported china from London to the Potteries was given as 20s. per ton and for English china from the Potteries to London as 32s. 6d. How this comparison came to be made publicly unless through either ignorance, culpable negligence, or a deliberate attempt to deceive, it is difficult to understand because a mere application for the rates made by a private individual without explanation or reason of any kind for the application brought forth the following list of rates by return of post. China and earthenware (from the Potteries to London),

**Another
Illustration.**

packed in cases or crates, at carrier's risk, and collected and delivered, 32s. 6d. per ton ; at owner's risk, 30s. per ton. Ditto, consigned direct to a shipper for export, carrier's risk, 26s. 8d. per ton ; owner's risk, 25s. China and earthenware sent loose at owner's risk and exclusive of collection and delivery, and also of packing into the railway truck and unloading, in 2-ton lots, 20s. ; 3-ton lots, 19s. 2d. ; 4-ton lots, 18s. 4d. per ton. It was clear, therefore, that the manufacturers in the Potteries had the advantage of a 20s. rate equally with their foreign competitors. An important fact omitted or suppressed was that the 32s. 6d. rate included not only collection and delivery but also insurance against damage, whereas the 20s. rate included none of these services. All the railways did for this charge was haul the china from station to station. Upon the sender fell the task of carting to the station and packing his china or earthenware securely in the railway truck and the receiver had to unpack and cart away. There is no possible basis of comparison between a 20s. rate under these circumstances and a 32s. 6d. rate, which includes the services mentioned.

With these examples of the carelessness with which allegations of preferential treatment for foreign imports are made, specific cases

**Reckless
Allegations.**

may be left and the consideration of general principles resumed. It has been seen that legally the allegation that preferential treatment is given to foreign imported produce, cannot be maintained because Parliament has prohibited not preference pure and simple, but undue preference. Full liberty has been given to take into consideration circumstances such as volume and regularity of traffic. And these conditions have been found more commonly, though not exclusively, in conjunction with foreign than with home produce. There might be found, if the search were made, scores, probably hundreds of instances where special or exceptional rates have been made for home produce which is not even distantly affected in the matter of transport by the competition of foreign imported produce. It is one of the commonest things in business for a trader who has a large consignment to send, for instance, one running into a thousand tons, or perhaps even a hundred tons, to apply to the railway company concerned for a special rate, and to be successful in his application. That rate must be entered in the rate books of the stations affected, and as long as it remains there it is available for

all other consignors who can offer a similar quantity for the same place. But what is the position of the small consignor of, say, one or two tons whose goods are going exactly the same journey as the large consignor's? Is he entitled to complain that his larger trade rival is being treated with undue preference? Apparently he does not think so because complaints of this nature are never heard. In the home trade it is unquestioningly recognised as a principle to be followed that the larger the consignment the lower the rate per ton (within limits, of course), to which it is naturally entitled. It is only when the difference occurs in connection with foreign imported produce that there is an outcry. Yet the principle is the same whether the goods affected are of home or foreign origin.

In the last resort the question is narrowed down into one of pure business, or railway economics. The managers of the railways know from experience that it pays them to make these exceptional rates for foreign imported goods (and for those of home origin also), when they can be assured of a large and constant volume of traffic. And knowledge of the fact and the practical application of it are not confined to this country. It is put into practice in other lands of which probably the finest example is afforded by United States practice. It is neither more nor less than the practical application of this principle to the large loads and long hauls possible in that country that has given it the extraordinarily low average ton-mile rate of a halfpenny to which earlier reference has been made. And it is also part of the accepted practice of charging "what the traffic will bear." The allegation of preference is defeated, therefore, by the general application of the principle of lower rates for large quantities not only to foreign traffic coming in from the ports, but also to home produce moving about inland, and further by the fact that a special rate, as long as it remains on the rate books, is applicable to all consignments in both directions between the two points to which it relates so long as the attached conditions are fulfilled by the consignor.

Another practical question to be borne in mind is that if Parliament dropped the word "undue" and prohibited preference without qualification of any kind, it would not prevent much of this foreign competition, and would "cut both ways." It would not affect the foreign competition because most of the specially low rates have been framed

**Can Change
be Effected?**

to meet the competition of water carriage. If the rates were raised for the Southampton docks traffic and the Liverpool meat traffic, the goods would not cease to reach the London markets. Instead they would make the whole journey to London by sea and the farmers and traders who complain would be no better off in the end. It would "cut both ways," because if preference is prohibited many of the special, or extraordinary rates which represent reductions from the authorised class rates, would probably have to be abandoned, and the return to the class rates would be a serious disadvantage to trade and commerce generally.

The subject is one that has been revived at intervals for many years and yet Mr. Macnamara, to whose evidence before the 1913

Enquiries.

Royal Commission reference has already been made, stated that the Southampton case is the only one that has ever been brought before the judicial body which then was appointed to hear and decide such questions, viz., the Railway and Canal Commissioners. And in this instance the allegations were not proved. There has even been a special Parliamentary Committee (known as Lord Jersey's Committee), appointed to consider the allegations that imported foreign farm and dairy produce was unduly preferred. This body was not bound in its decision by questions of legality. It was appointed to enquire as to actual conditions and had freedom to deal with them in its report from the point of view of business, equity, or common sense. And yet the committee also found, according to the evidence of Mr. W. F. Marwood, C.B., Assistant Secretary to the Board of Trade, given before the 1913 Commission, "that any preference there was was sufficiently explained by such considerations as volume and continuity of traffic."

When all is said, however, and when it is convincingly demonstrated that purely business and economic conditions explain all the

Inequalities Due to Economic Conditions.

inequalities, the fact will still remain that immense quantities of imported foreign produce are being carried by English railways at much lower rates per ton than those at which home produce is carried, and that the companies are making a better profit out of this traffic than they do out of the consignments of home produce. The explanation, it is hoped, has been satisfactorily given; the remedy is not so easy to find unless it be in a better organisation in connection

with and a more complete concentration of home produce so that it can be handed to the railway companies in larger volume and with greater regularity than has hitherto been the case. In the matter of agricultural organisation for the transport and marketing of fruit, vegetables and other farm produce, the United Kingdom is far behind some of her European neighbours, whose natural advantages are not in any way superior to ours, even if they are not occasionally inferior. It is an old subject, this question of closer combination and improved organisation. It has been preached for years, but the progress made towards its realisation has been so discouragingly small that, apparently owing to the natural temperament of the British agriculturist, its early attainment seems unlikely.

CHAPTER VIII

GOVERNMENT CONTROL OF RAILWAYS

THE fact of Government control of railways is so familiar that in all probability few people ever pause to think about its origin, the reason

**Government
Control of
Railways.**

for it, or its extent. It is an everyday circumstance that excites neither attention nor comment unless some person, angry because of an unfortunate experience, says, in indignation, that the Government ought to make the railways do something which will prevent him from suffering again what he regards as injustice, imposition, or laxity. We are all prone to cry out for Government control or interference under such circumstances. But why is there Government control of the railways? In these days we are all familiar with limited liability companies; impersonal bodies, which, being incorporated by law, have legal entity entitling them to act almost as freely as a single person. They are required to conform to various restrictions and regulations imposed solely for the protection of the public from fraud, "the public" being their shareholders and all with whom they have business dealings. The requirement of the use of the word "limited" in their titles is an instance of this. Outside these regulations, however, the limited company has as much freedom as the private trader or of traders joined in an ordinary unlimited partnership. For it must be remembered that both are equally subject to such things as Factory Acts. The railway companies are subject to all this control and more.

Possibly, if the railways were new things in process of evolution at the present time they would be ordinary limited companies.

**Exceptional
Position of
Railways.**

There is nothing to prevent such a company from buying a considerable quantity of land and using it for any proper business. Why, therefore, should the railway companies be subject to any different treatment? Why should they not have registered themselves as ordinary limited liability companies and have proceeded with their business? In every respect but name they are limited companies. They are incorporated joint stock companies; they are governed by

Boards of directors, and the liability of their stockholders is limited to the amount inscribed on the face of their stock or share certificates.

Primarily the reason appears to be that their origin antedates limited liability legislation. The company laws did not take useful shape until 1862 ; there was nothing even resembling them until 1844. The first railway Act was passed in 1801 authorising the construction of the Surrey Iron Railway. That, of course, was a very

**Reason for
Exceptional
Position.**

different thing from the railways as we now know them. Still, there was the precedent. There were no limited liability laws, and an Act of Parliament was required for the incorporation of a company to construct a railway. Nothing was then legally known but a private partnership, a Charter of Incorporation granted by the King, or a company incorporated by Act of Parliament. Possibly a very wealthy person having faith in the commercial prospects of such an undertaking as the Surrey Iron Railway might have used his wealth to purchase land and construct the railway without let or hindrance. But even in those days a railway was an undertaking in which a number of capitalists had to join their capital in order to carry out the objects in view. There is no obvious reason why these pioneers should not have combined in an ordinary partnership, except that each person concerned would have been jointly and severally responsible for the debts of the whole undertaking. In the case of failure it would have been possible for the creditors to proceed against all or any single one of them for the recovery of the whole debt owing. The raising of capital for large undertakings under such circumstances, would have been virtually, if not absolutely, impossible. Better protection than that of ordinary partnership arrangements was required to enable capital to flow freely into such channels for its useful employment, and so the joint stock company, incorporated by Act of Parliament, became familiar, though not the common thing the limited liability company is to-day. In this way Parliamentary control began, and the origin has some antiquarian interest, if no other.

**Government
Caution.**

Probably the reasons which actuated Parliament at the outset were not clearly defined. There was, no doubt, a feeling that something new, and of immense power for good or evil, was being created ; and that special care in regulating the powers conferred was required. Now, however,

the control is such a familiar and accepted condition that the reasons for it are clearly defined as follows : Because (1) special powers of purchase were given ; (2) monopoly powers were given ; (3) of the relation of the railways to the welfare of the public ; (4) the interests of the owners and the public vary to a large extent.

Take, briefly, these four points ; there is first the special powers of purchase. The assistance which Parliament rendered in this connection may seem small. In earlier pages attention has been called to the extent to which the landowners were able to "bleed" the companies.

**Special Power
of Purchase
of Land.**

As a general rule the price paid for land has been extortionate, and as a consequence the capital burden has been unduly swollen. But without the powers of compulsory purchase, which Parliament gave them, the railway companies might possibly not have been able to come into existence at all, or their routes might have been so extraordinarily devious and circuitous as to have imperilled their existence or nullified the advantages of rail transport. Without the powers of compulsory purchase bestowed by Parliament it would have been possible for any and every landowner to refuse to part with his land. One or two obdurate persons could have wrecked a scheme which in later years has proved itself to be of vital importance to the nation.

The monopoly powers given to the railway companies, which forms the second reason for control, were more apparent, perhaps, in the early days than they are now. The modern

**Monopoly Given
to Railways.**

system of great trunk lines has left scarcely any place of importance at the mercy of one company ; but it must be remembered that the original lines were not trunk lines. They were more or less isolated fragments designed to serve particular districts of comparatively limited area, and those districts were more or less dependent upon the line which ran through them. They still retained the old roads and in some cases the canals, but the railways were intended to displace both these, and to a large extent they did so. Even now, with all the developments, there remains a considerable extent of country within which monopoly conditions still prevail. The railway service between agricultural districts and market towns is still largely of this character. These places are not touched by the competition enjoyed by large centres of population in all parts of the country.

The third and fourth reasons are really inseparable. The welfare and interests of the public demand cheap and rapid means of communication for passengers and goods of all kinds.

**Railway
Companies and
the People.**

It is not necessary to dwell upon the dependence of huge aggregations of the population upon the regular, prompt and speedy transport of food-stuffs, or of industry upon the equally efficient movement of its raw materials and finished products. Cheapness, efficiency and equality of treatment are vital in both these connections. Without them the industrial development of Great Britain could not possibly have been a tithe of what it is. On the other hand, of course, the interest of the railways, or at any rate, their shareholders, is solely concerned with profit-earning. And the pursuit of profit is not always such a matter of enlightened self-interest as the old economists believed and taught. Given monopoly powers a large profit may possibly be obtained from a minimum of business exertion combined with high charges. On the other hand, the same object may be attained from an increased volume of business combined with rates showing a minimum of profit. Parliament decided that so far as possible the latter method should prevail in connection with the railway companies. Public welfare also includes the safety of the lives and property of the community—the protection of both from injury arising from the inefficiency of the means of transport provided and the neglect or careless use of those means.

The control of Parliament is, therefore, exercised first over the construction and equipment of the railways and the rates and fares which they charge and, secondly, by requiring the companies to furnish to the public detailed particulars as to the nature and volume of the business they conduct, the charges they make, the amounts they earn and the profits resulting. A brief statement such as this gives a fair idea of the nature and extent of Parliamentary control ; but this aspect of the question is worth a little more detailed elaboration. It has already been seen that the control was exercised from the very outset in the fixing of the tolls which the companies were empowered to charge for the use of their “rail-ways” by common carriers. It is also on record that in 1836 the Taff Vale Railway Company (now amalgamated with the Great Western) were prohibited from paying more than 10 per cent. dividend per annum, and provision

**Scope of Govern-
ment Control.**

was made for the reduction of the company's rates if the profit earned was excessive. The company were required to submit their accounts to the justices sitting in quarter session who were empowered to make such reductions in the rates charged as would bring the profits within the prescribed limits. Justices of the peace in quarter sessions were empowered to do many things in those far-off days, which, now, have come to be regarded as altogether outside their purview as justices ; and many of these old powers though fairly well exercised, have been abrogated. But the idea of their attempting to regulate railway rates has its humour, especially in view of what has been previously written concerning the years spent on this kind of work at a later date, the complications and grievances which it evoked, and the drastic measures which Parliament had to take to end the difficulties.

In 1840 Parliament began to exercise a general control, as distinct from the supervision, of detail such as the tolls which each particular company might charge. An Act was passed in that year requiring notice of the opening of all new lines to be given to the Board of Trade, the object being to give the officials of that Department an opportunity to inspect the permanent way and its equipment. Possibly it was thought that mere inspection would secure efficiency of construction ; possibly experience showed that it did not ; but at any rate, two years later power was given to the Board to delay the opening of any new railway until the inspectors were satisfied as to the character of the work—as to whether construction had been carried out in a manner that made the line safe and suitable for public use. This power of inspection and delay is now vested in the Ministry of Transport, concerning the origin of which more particulars will be given later, and it has been developed in various directions. It has been extended, for instance, to the rolling stock, the point, of course, not being as to its comfort, but its stability and its equipment in such matters as brakes. Also in case of accident the Ministry has power to, and does, send down an inspector to hold an enquiry and to report as to the cause of the accident. There was a feeling in the first half of the nineteenth century, when so many railways and amalgamations of railways were being promoted, that the Board of Trade should have power to consider schemes from the point of view of their usefulness not merely to the districts

**Railways
and the
Board of Trade.**

The first of these was the discovery of gold in California in 1848. This discovery led to a great influx of people to California, and the state became a great center of population. The second was the discovery of gold in Nevada in 1859. This discovery led to a great influx of people to Nevada, and the state became a great center of population. The third was the discovery of gold in Colorado in 1859. This discovery led to a great influx of people to Colorado, and the state became a great center of population. The fourth was the discovery of gold in Idaho in 1860. This discovery led to a great influx of people to Idaho, and the state became a great center of population. The fifth was the discovery of gold in Montana in 1862. This discovery led to a great influx of people to Montana, and the state became a great center of population. The sixth was the discovery of gold in Wyoming in 1869. This discovery led to a great influx of people to Wyoming, and the state became a great center of population. The seventh was the discovery of gold in Utah in 1871. This discovery led to a great influx of people to Utah, and the state became a great center of population. The eighth was the discovery of gold in Arizona in 1876. This discovery led to a great influx of people to Arizona, and the state became a great center of population. The ninth was the discovery of gold in New Mexico in 1878. This discovery led to a great influx of people to New Mexico, and the state became a great center of population. The tenth was the discovery of gold in Texas in 1880. This discovery led to a great influx of people to Texas, and the state became a great center of population.

The discovery of gold in California in 1848 led to a great influx of people to California, and the state became a great center of population. The discovery of gold in Nevada in 1859 led to a great influx of people to Nevada, and the state became a great center of population. The discovery of gold in Colorado in 1859 led to a great influx of people to Colorado, and the state became a great center of population. The discovery of gold in Idaho in 1860 led to a great influx of people to Idaho, and the state became a great center of population. The discovery of gold in Montana in 1862 led to a great influx of people to Montana, and the state became a great center of population. The discovery of gold in Wyoming in 1869 led to a great influx of people to Wyoming, and the state became a great center of population. The discovery of gold in Utah in 1871 led to a great influx of people to Utah, and the state became a great center of population. The discovery of gold in Arizona in 1876 led to a great influx of people to Arizona, and the state became a great center of population. The discovery of gold in New Mexico in 1878 led to a great influx of people to New Mexico, and the state became a great center of population. The discovery of gold in Texas in 1880 led to a great influx of people to Texas, and the state became a great center of population.

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1. The first part of the document discusses the importance of maintaining accurate records of all transactions, including sales, purchases, and expenses. It emphasizes the need for regular reconciliation and the use of reliable accounting software to ensure data integrity.

2. The second part outlines the various methods for collecting and analyzing market data. This includes primary research through surveys and focus groups, as well as secondary research using industry reports and public data sources. The goal is to gain a comprehensive understanding of the market landscape.

3. The third part details the process of identifying and evaluating potential risks. This involves conducting a thorough risk assessment to identify both internal and external threats to the organization's success. Strategies for risk mitigation are then developed and implemented.

4. The fourth part focuses on the development and implementation of a robust marketing strategy. This includes defining target markets, selecting appropriate marketing channels, and creating compelling promotional campaigns. The strategy is designed to drive growth and increase market share.

5. The fifth part discusses the importance of continuous monitoring and evaluation. This involves regularly tracking key performance indicators (KPIs) and adjusting the business plan as needed to stay on track with the organization's goals.

6. The sixth part provides a summary of the key findings and recommendations. It highlights the critical areas for improvement and offers actionable steps for the management team to implement. The document concludes with a statement of confidence in the organization's future success.

11.

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1. The first part of the document is a list of names and addresses, which appears to be a directory or a list of subscribers. The names are written in a cursive script, and the addresses are listed below them.

all terminal charges. This was the section which led to the immense work of revision (not finally completed until 1894), to which extended reference has been made in the chapter dealing with the evolution of railway rates and charges. The ultimate conclusion of all the labour, it will be remembered, was the abandonment of the maxima rates, over the preparation of which so many years had been spent and the indirect setting up of new maxima within and below these, by the provisions of the Railway and Canal Traffic Act, 1894. Section 1 of this latter Act laid it down that—

“Where any company or companies have, since December 31st, 1892, directly or indirectly increased any rate or charge, or hereafter increase, directly or indirectly, any rate or charge, then, if complaint is made that the rate or charge is unreasonable it shall lie on the company to prove that it is reasonable, and for that purpose it shall not be sufficient to show that the rate or charge is within any limit fixed by an Act of Parliament or by any Provisional Order confirmed by Act of Parliament.”

The Act of 1888 was also important in that it amplified the law relating to reasonable facilities and undue preference, and by section 27 placed on the railway companies the duty of proving that differences in charges do not amount to undue preference. The same section also includes the enactment as to the question of undue preference being considered in relation to public service, which has been quoted earlier, and the restriction that there shall be no difference in rates or treatment in respect of “the same or similar services.” In the same Act there were various minor provisions, such as the fixing of the charge for copies of the classification at 1s., and the requirement that all rates, tolls and terminals should be kept separate and distinct in rate books at the stations to which the rates apply.

**Reasonable
Facilities.**

Part III of the Act of 1888 dealt with canals and applied all the railway provisions of Part II to them. It went much farther than this, however. Section 38 provided that where the directors or officers of a railway company, or any person on their behalf, had control over canal charges, and it was proved to the Commissioners that those charges were such as to divert traffic from the canals to the railways to the detriment of the canals or of traders, the Commissioners might require the charges to be adjusted so as to be reasonable as compared with the railway charges. Failing adjustment, the Commissioners themselves might make the necessary alterations. Power was also

**Protection of
Canals.**

conferred on the Board of Trade to inspect canals which are in such a condition as to be dangerous to the public, or to cause serious inconvenience or hindrance to traffic, and to enforce efficiency as in the case of a railway. Railway companies were prohibited without express statutory authority from using their funds to acquire any canal interests, and if they contravened the section "the interest so purchased shall be forfeited to the Crown and the persons responsible for the misapplication of railway funds shall be liable to repay them." The one relief granted was power to authorise the abandonment of a canal, or part of one, which was unnecessary or derelict ; but before the Board of Trade could give this sanction it must be proved (1) that the canal is unnecessary ; (2) that the application has been authorised by the shareholders ; (3) that proper notice has been given ; and (4) that compensation has been made to all persons entitled to it.

On the whole, it will be seen that the Act of 1888 was of far-reaching importance, placing the railway companies under much more stringent government control than had previously existed. The futility of some of the work done as the outcome of the Act has already been referred to. One other comment that arises is as to the small use which traders made of the powers conferred upon them, especially in relation to canals. It is frequently alleged that canal traffic is stifled in the interests of the railways and that the canals themselves are inefficient. The clauses of the Act which have been quoted appear to provide a remedy for both these allegations, if traders will have the energy and enterprise necessary to take the preliminary step of bringing the matter before the Board of Trade. It may be urged that most traders would not care to face the expense involved in proving complaints of this nature which might be made ; but there are plenty of canal carrying companies interested in the efficiency and cheapness of water transport, and combination to bring such questions before the properly constituted authorities should not be beyond the bounds of possibility if there is any solid basis of justification for the allegations occasionally heard.

Other Acts have been passed since the 1894 Act to which reference

Traders' Indifference.
Accounts and Returns Act.

has been made, but they are of minor importance and need not be reviewed in detail. An exception to this, however, is the Railway Companies

(Accounts and Returns) Act, 1911. Extended reference to this Act

will be necessary in the next chapter dealing with statistics and accounts. Here it is only necessary to refer to the subject as indicating another direction in which Government control is exercised. As early as the Act of 1840 the railway companies were required to make returns to the Board of Trade in respect of traffic, tolls, rates, and accidents. The power thus given has been maintained unimpaired ever since, and the railway companies have been required to make annual returns according to forms devised by the Board of Trade, the general outlines of which, as well as the details, have been published in special Blue Books issued from year to year. The point of interest, of course, is that the publicity thus secured has operated as a check on the acts and policy of the companies.

Finally, there is the 1921 Act, which revolutionised much that hitherto had been regarded as more or less permanent, not only in connection with the railways themselves, but also national policy. This subject, however, is so big that it demands a separate chapter.

CHAPTER IX

MORE CONTROL : THE RAILWAYS ACT OF 1921

ALREADY there have been many references to the Act of 1921, and some information has been given concerning one of its most important objects—the amalgamation of the railway systems of the country into four great groups.

Amazing number of Companies.

It is an amazing thing that, notwithstanding these huge agglomerations, there are still no fewer than 87 companies whose names appear in the statistical returns issued annually by the Ministry of Transport. Among them are the City and South London, the Metropolitan and the Metropolitan District, which, of course, are large undertakings dealing with an enormous volume of passenger traffic. The list also includes some of the joint committees. In the main, however, about 80 of the 87 are quite insignificant. No fewer than 31 of them are headed “non-working companies”; others are quite unimportant light railways, serving a useful purpose, no doubt, but of such relative insignificance that one wonders why the Ministry of Transport burdens its annual statistics with so many details concerning them. For all practical purposes the only things that matter are the four main groups. Some of the other information is rather confusing and very irritating.

The circumstances which led up to this departure from the traditional policy of the country have already been referred to.

A Complete Break with the Past.

It was a complete break with the past, and probably it would have been impossible without that change in outlook which was one of the results of the war. During that strenuous period we became familiarised with large centralised undertakings—the Ministries of Munitions, Food, and National Service, to mention but three of them. These things were essential for the proper conduct of the war, and no one cavilled; but looking backwards at this distance of time, one is inclined to feel that afterwards there was too great a craze for doing things on a grandiose scale. Even large industrial amalgamations, that in the old days would have been criticised as “trusts” capable of becoming oppressive to the community generally, were encouraged directly or indirectly; as they were announced one after another

there was never a word of criticism. In this atmosphere the Ministry of Transport was conceived, and its original idea was one of the most grandiose of the whole lot. However, in the end it got somewhat whittled down to a more practicable institution capable of useful service.

Its first ideas as to the future of the railways included several that were unusual, to say the least. For instance, in connection with management it was stated in the White Paper explanatory of the Government policy—

Some Unusual Ideas.

“MANAGEMENT.

Each of the grouped railways will require a Board of Management, and in order to secure efficiency and uniformity, and avoid undue cost, the number of members composing the Board should be limited to probably 21. The composition of the Board is considered to be of the greatest importance, and whilst in the past the directors of railway companies have all been appointed by the shareholders, the Government are of opinion that the time has arrived when the workers—both officials and manual workers—should have some voice in management.

The Board of Management should, in the opinion of the Government, be composed of representatives—

(a) of the shareholders, who should form a majority on the Board, and of whom a proportion should hold large trading interests; and

(b) of employees, of whom one-third might be leading administrative officials of the group, to be co-opted by the rest of the Board, and two-thirds members elected from and by the workers on the railway.

“FINANCE.

The Act of Parliament should lay it down that rates and fares shall be fixed at such a level as, with efficient and economical management, will in the opinion of a prescribed authority enable railway companies to earn a net revenue substantially equivalent, on some pre-war basis to be settled in the Act, to the combined net revenue of all the companies absorbed in the group. With due care and economy it should be possible for group companies to improve on their pre-war return; but, in that event, the Government is of opinion that such surplus revenues should not accrue entirely to the companies. The State would be very materially extending the ‘charter’ of the companies and is entitled to participate in such surplus revenues, and settlement of a suitable sliding scale to regulate their division presents no insuperable difficulty.

“DEVELOPMENT FUND.

It is not contemplated that the Government’s share of the surplus revenues should be thrown into the general revenue of the country. Much development work has to be done which is beyond the financial resources of the localities, and the intention is that the Government’s share of these surplus profits should be funded for development

purposes, to assist backward districts, to develop light railways, and for other appropriate purposes in connection with transportation, as may be approved by Parliament in the Act."

These were rather novel ideas, especially that relating to management, and at the outset they aroused some criticism. The critics enquired, quite pertinently, what right either Parliament or the Ministry of Transport had to interfere with the Boards of Directors in the way they proposed in the above paragraphs. The inclusion or non-inclusion of the officials in the

**Gratuitous
Interference with
Management.**

Board of Directors would probably make little difference either way. It is impossible to imagine any Board of Railway Directors, however old-fashioned and conservative, attempting to direct the affairs of the company they control without the assistance of the advice of their most expert officials. A board that acted without such guidance might involve their company in grave difficulties even if they did not altogether ruin it. On these grounds the critics contended that there was no need to include officials on the boards of management; that the work could be done just as efficiently under the old arrangement which better defined the interests of the owners of the capital of the companies and their paid servants. This latter criticism was applied with equal, if not greater, force to the inclusion of the representatives of manual labour. The critics enquired on what grounds of equity, or policy, the management of the undertaking, which had been created out of shareholders' invested capital, should be entrusted to men who had no financial interests at stake, no capital to lose, and insufficient breadth of training and outlook to be able to take a comprehensive view of the affairs of a vast undertaking. Further, the critics demanded why the Government, which has not put a single halfpenny piece into the transport industry, should endeavour to set up what at least was a colourable imitation of a State system in this manner, and why, if a State system was desired, the Government did not do, what, in their view, was the right thing—set up one legitimately by buying out private enterprise on fair, equitable terms. From these criticisms it will be inferred that the critics had no objection to the proposed amalgamations, as such, or to a State system, but they were opposed to the manner in which it was proposed to obtain a colourable imitation of a State system,

which would leave the Government in an irresponsible position and yet give them power to interfere in directions which hitherto had been regarded as outside their sphere, and also would give them a share in the profits of the companies without their making any financial contribution or assuming any financial liability.

In the end these particular provisions did not appear in the 1921 Act. That Act is a very formidable document in six parts,

**The Three
Tribunals.**

and running, with its schedules, to 90 pages. It established three Tribunals: (1) For the purpose of effecting the amalgamation; (2) for the fixing of rates and fares, and (3) for regulating wages.

1. THE AMALGAMATION TRIBUNAL. For the purpose of dealing with schemes of amalgamation and absorption, a tribunal called the Railways Amalgamation Tribunal was constituted. It consisted of three Commissioners, "to hold office until all matters with respect to which they have jurisdiction under this Act have been settled." The matters referred to this tribunal were: (i) The amalgamations provided for by the Act; (ii) the approval of suggestions for the allocation of the sum of £60,000,000 agreed as a composition of claims in respect of Government possession of the railways during the war period; (iii) to settle as to the future of the Railway Clearing House. The first Commissioners were Sir Henry Babington Smith, G.B.E. (President), Sir William Plender, G.B.E., and Mr. George John Talbot, K.C.

The procedure for the amalgamation of the constituent companies within the four groups was laid down by the second section of Part I—

"2.—(1) The constituent companies in any group may on or before the first day of January, nineteen hundred and twenty-three, submit to the Minister of Transport (hereinafter referred to as 'the Minister') an amalgamation scheme framed in accordance with the provisions of this Act which has been agreed to by all those companies.

"(2) The Minister shall refer to the amalgamation tribunal hereinafter constituted any scheme so submitted to him, and the tribunal, unless it appears to them that the scheme does not conform with the requirements of this Act or that the provisions of this Act relating to the procedure preliminary to the submission of an agreed scheme have not been complied with, shall confirm the scheme.

"(3) If the constituent companies in any group fail to submit an agreed amalgamation scheme framed in accordance with the provisions of this Act on or before the said date, a scheme for the amalgamation of the constituent companies in that group shall be prepared and settled in accordance with this Act by the amalgamation tribunal."

The working out of the amalgamations proceeded rapidly and, in spite of enormous difficulties, by the appointed date, 1st January, 1923, of the twenty-six constituent companies in the four groups, twenty-five had so far come to an agreement that three of the groups were constituted. When it is remembered that the Amalgamation Tribunal only began to function in November, 1921, and that four groups had to be formed out of 121 separate companies, there is strong proof of the British capacity for organising successfully a big commercial development. As a result, the four new companies were operating under the new conditions from January, 1923, although the groups were not fully constituted in all their details. Good sense and a desire to fall in with a scheme almost universally admitted to be necessary and a minimum of red tape, in connection with the proceedings of the Tribunal, resulted in the work being done expeditiously and economically. The schemes were prepared, mainly, by the companies themselves and approved by the Tribunal. They brought about a fusion of capital and a reissue of securities and shares to shareholders in the original companies, under a system which necessitated the use of a very small amount of cash.

2. THE RAILWAY RATES TRIBUNAL. This Tribunal consists of three permanent members. It has full authority over all railway rates, fares and charges, and over the conditions for the conveyance of minerals, goods, and livestock. It is a Court of Record and has an official seal. The three permanent members are whole time officers and may hold office for seven years, but are eligible for reappointment. "One shall be a person of experience in commercial affairs, one a person of experience in railway business, and one, who shall be the president, shall be an experienced lawyer." The business of the Tribunal is so to fix rates, fares, and charges that they may yield, together with other sources of revenue, an annual net revenue (referred to as the standard revenue) the equivalent of the aggregate net revenue earned by the constituent and subsidiary companies absorbed in any one of the groups, in the year 1913.

The central office of the Tribunal is to be in London, but sittings may be held in any part of Great Britain as may be convenient.

Two panels have been constituted. The first of these is known as the general panel and consists of thirty-six members. Of these, twenty-two are nominated by the President of the Board of Trade,

after consultation with such bodies as he may consider to be most representative of the trading interests; twelve are nominated by the Minister of Labour, after consultation with such bodies as he may consider most representative of the interests of labour and of passengers upon the railways, the remaining two members being nominated by the Minister of Agriculture and Fisheries, after consultation with such bodies as he may consider most representative of agricultural and horticultural interests. The second panel, known as the railway panel, consists of twelve members, eleven of whom are nominated by the Minister after consultation with the Railway Companies Association, and one nominated by the Minister to represent light railway companies, not parties to the Railway Companies Association. Members of both panels will hold office for three years and be re-eligible. For particular cases or proceedings, if a request be made, or if the Minister think fit, two additional members may be added to the rates tribunal, having all the powers and functions of a permanent member, one from the general and the other from the railway panel, on the nomination of the Minister, the nomination being made of persons with special knowledge on the particular case.

The Tribunal is to report annually to the Minister, and the report must be laid before Parliament.

All functions or powers hitherto exercised by the Railway and Canal Commission, now exercisable by the Rates Tribunal under the Act, ceased from the appointed day to be functions or powers of the Railway and Canal Commission.

The Tribunal also has power to settle questions—

1. That may be brought before it as to alteration of the classification of merchandise or as to the class of articles not yet classified.
2. As to the variation or cancellation of through rates.
3. The institution of new, and the continuance, modification or cancellation of existing group rates.
4. The variation of any toll payable by a trader.
5. Allowances for terminal or private sidings' charges not incurred.
6. As to the reasonableness of any charge made for services or accommodation for which no authorised charge is applicable.
7. As to the reasonableness of any conditions as to packing of

articles specially liable to damage, or liable to damage other merchandise.

8. As to passengers' luggage.

9. As to the constitution and functions of local joint committees.

There are several clauses dealing with this thorny subject. The Tribunal has very full powers, but the groups are to submit schedules of charges, and the final scales will doubtless be fixed after all possible considerations have been weighed, bearing in mind the general instructions as to providing a standard revenue. But all rates, fares, and charges are to be subject to periodical revision, and the schedule of standard charges and conditions of carriage are to be printed and kept on sale by the companies at a reasonable price and at convenient places.

The Fixing of Rates and Fares.

THE WAGES TRIBUNALS. Part IV of the Act deserves very careful study, especially by those who are convinced that the interests of employers and employed are best served by co-operation and harmonious collective bargaining. Both parties and their organisations are recognised. It is more than hinted that the companies and the railwaymen's unions should make their own arrangements as to rates of pay, hours of duty or other conditions of service. Should, however, the interested parties fail to agree, the next step is neither strike nor lock-out, but the matter at issue shall be referred in the first place to the Central Wages Board, or on appeal to the National Wages Board, which has been reconstituted by the Act. This, however, does not complete the machinery. Prevention is better than cure, and thus each railway shall have one or more councils, consisting of officers of the company and elected representatives of the men. The functions of these councils shall generally be those recommended in the Report¹ of the Reconstruction Committee on the Relations between Employers and Employed, published in March, 1917.

THE CENTRAL WAGES BOARD. This consists of eight representatives of the railway companies and eight representatives of the railway employees. The men's unions are definitely recognised by the Act: "The employees' representatives shall be appointed by the railway trade unions, four by the National Union of Railwaymen, two by the Associated Society of Locomotive

¹ See paragraph 16 of that Report (Whitley Report). Appendix No. XVI.

Engineers and Firemen, and two by the Railway Clerks Association." Thus, with the grouping of the companies into four great units, there comes the recognition of the men's organisations. The two sets of organisations are recognised as the parties to a collective bargain, and to something more: for these recognised parties are looked to, in the first instance indirectly if not directly, as the guardians of the smooth working of our railways. There is an appeal from decisions of the Central Wages Board to the National Wages Board. The constitution of this Board is of more than passing interest. It consists of six representatives of the railway companies, six representatives of the employees (two appointed by the National Union of Railwaymen, two by the Associated Society of Locomotive Engineers and Firemen, and two by the Railway Clerks Association), and *four representatives of the users of railways*. There is an independent chairman nominated by the Minister of Labour. The four representatives of *users* are to be nominated by the Parliamentary Committee of the Trades Union Congress; the Co-operative Union; the Association of British Chambers of Commerce; and the Federation of British Industries—one by each.

The National Wages Board will only be concerned with cases as to which the Central Wages Board has failed to find a solution.

Thus the Act establishes a *Whitley System* for settling difficulties between employer and employee on our railways. No man need have a grievance, and nurse it because of any difficulty in getting a hearing. From the moment the Act came into force and the various boards were established in working order, there ceased to be any excuse for a strike on the part of the men, or for retaliatory action on the part of the management.

Here the industrial world has been given a great object lesson in how to do it. Friction and class warfare have cost our country dear. The eyes of all those engaged in our industries and commerce should be fixed on the working out of this great experiment. It will doubtless cause great searching of heart among those who desire industrial unrest. Foreign propagandists will realise the bulwark this new policy raises, not only in the safeguarding of the best interests of labour, but against the chances of strife, both internal and external. They and those who think with them will undoubtedly do their worst to make the machinery unworkable.

But the good common sense of all true Englishmen will welcome Part IV of the Act as a statesmanlike attempt to keep our industries sane and healthy. The policy will be watched and its success will be acclaimed. May this great attempt to find an avenue, by means of which organiser and worker, employer and employee, may work harmoniously together, be crowned with success. Should this be the outcome, we as a great industrial community will, indeed, find ourselves at the outset of a new epoch in our history well equipped for a prosperous future.

This brief summary of the Act necessarily leaves many details untouched, but it is impossible to enumerate them all; the Act itself can be referred to. Before leaving the subject, however, it is interesting to quote the views of the late Sir Wm. M. Acworth as to what the Act does—

“(1) It combines all the main railways of the country together with the smaller companies within their respective areas into four new groups.

“(2) It sweeps away that legacy of a bygone and simpler age, the whole inextricably complicated system of statutory maximum rates coupled with a nominal freedom of the companies to vary rates within the maxima, and substitutes therefor a new Railway Rates Tribunal with plenary power to fix (and subsequently vary) such actual rates, fares and charges as may produce for each company a standard ‘revenue,’ fair both to the company and to its customers.

“(3) It recognises that the wages and conditions of employment of the staff engaged in an essential public service can no longer be regarded as a matter of private bargain—still less as matter for mere employers’ dictation—and establishes a hierarchy of councils and boards, culminating in a National Wages Board in which representatives of the public have the final voice.

“In other words, Parliament has definitely asserted the right to intervene to secure in the public interest harmony and co-operation in railway management (1) by substituting for a welter of competing companies, ill matched alike in size, in financial strength and in intrinsic resources, four strong organisations, each based on a semi-monopoly of an extensive territory, leaving it for the future to decide whether they will work their undertakings in co-operation, or, where their areas meet or overlap, in orderly and regulated competition; (2) by transferring the control of a subject essentially economic from the rigidity of statute law and the formalities of a law court, with its precision of issues and its strict limitation of the parties to the issue, to a business tribunal entrusted with the function of surveying the question in all its bearings, of securing, on the one hand, from the traffic as a whole a reasonable return to the companies on the capital invested, and of seeing, on the other hand, that each separate class of traffic contributes, on what may be called ‘equality of sacrifice’ principles, its fair share of the total sum required; and (3) by providing

a constitutional means for exhaustive discussion of all questions affecting the pay and conditions of service of the staff, first between the parties themselves, and then by the same parties face to face with coadjutors who not only bring fresh minds to bear upon the matter, but also represent the public interests involved ; so minimising the probability that the public will suffer from a strike, local, or it may be national, due in its origin very probably to the hot-headedness or unreasonable obstinacy of a small group or even a single individual. Further, the Act provides for the compilation and publication of adequate statistics of operation, in order that the Rates Tribunal and the public may be in a position to judge whether the management of the railways under the new conditions is carried on with that efficiency and economy which is the expressed object of the Act to secure, and on which the right of each company to its standard revenue is made to depend."

Finally, something should be said as to the consequences of all this Government control. Those consequences must be fairly obvious. Necessarily Government control must add to the expense of working railways, and very little consideration will soon afford convincing evidence that, in this particular, control has been expensive from the very beginning. The Acts of Parliament necessary before the companies were able to begin work were control in its most intimate and minutest form. And instances have been given of the very considerable costs to which the companies were put to obtain their Acts. Companies of equal size financially and commercially to these original railway concerns can now be brought into being under the limited liability laws for less than a tithe of the cost of the Acts which were the necessary preliminary to the construction of a railway. Capital charges were also increased by the manner in which Parliament encouraged competition, which, after all, was only another and indirect method by which control was exercised, for in this way control was kept over the rates and tolls of the companies. As to this policy of encouraging competition, a joint committee of both Houses of Parliament, reporting in 1872, stated that Parliament's " policy, or want of policy, had rendered [Railway] systems less efficient and more costly." The encouragement of competition meant, of course, the duplication of the capital employed to do a given volume of work and an increased burden of capital charges to be borne by the traffic ; it increased in this way the expense of operation in order to secure the restriction and reduction of rates and charges which already were stringently restricted

**The Effect of
Government
Control.**

in the Acts incorporating the companies. The requirements as to construction, equipment, and working furnish further evidence of expense arising from control. The necessity of such requirements is not questioned. Parliament, it will be admitted, was, and is, entitled to lay down any conditions which appear likely to promote the safety of railway travellers. This is quite obviously a reason why the companies could not be allowed unfettered freedom to construct and equip their lines in the manner and up to a standard that seemed best to each particular company. A minimum standard must necessarily be set up, beyond which, of course, the companies could be given liberty to go as far as they liked. But while admitting its necessity, it is incumbent to recognise that it meant increased cost and diminished profit-earning power, which is an aspect of Parliamentary control that must not be lost sight of in any and every connection in which it may be imposed. The necessity may not be disputed, but the consequences should always be borne in mind. It is possible, of course, that this particular kind of control, being recognised as desirable, has been pushed farther than is necessary for the safety of the travelling public. Government departments that have to sanction or certify any particular thing are apt to be very self-protective in their methods. The responsibility of approval or disapproval rests with the officials of the departments concerned, and it is merely human nature that these gentlemen should take care that their responsibility is amply covered. The average civil servant does not care to be called upon to justify some particular decision which after events prove to have been unsound or not to have gone as far as subsequent experience has shown to be necessary. He is taking as few personal risks as possible, and he gives himself what business men call "ample cover" so that there shall be a margin for any errors he may have made. In this way regulations and requirements may have been carried to excess. One does not censure departmental officials ; one merely points out the tendency as an unfailing characteristic of human nature, especially of that portion of humanity that finds itself in a Government office.

Another expense inseparable from Government control is that arising from the preparation of the required statistics for publication. It may be large, or small ; possibly large in the aggregate

though relatively small to the whole expenditure of railway companies ; but it exists, and it must be taken into account when

**Expense and
Inelasticity.**

consequences of this nature are being estimated. Finally, it is often alleged that another kind of consequence of Government control is inelasticity of rates and charges. Parliament has fixed maxima charges, and while leaving liberty to reduce the actual rates to any extent below the maxima, has made it extremely difficult to restore to its former level a charge once reduced. Railway officials assert that this has made them chary of reducing rates. They are only induced to do so when they have fairly conclusive evidence that the reduced rate is not going to be an unprofitable one ; they are not inclined to be unduly speculative in their actions in such matters. Doubtless other consequences of Government control exist which have escaped notice, but sufficient will have been said to bring out the point intended—that it has its disadvantages as well as its advantages. That it may easily be carried to harmful lengths is clearly apparent ; that it is necessary will not be disputed. The determining point is whether “on balance” the ends to be attained justify the means taken to attain them.

CHAPTER X

RAILWAY STATISTICS AND ACCOUNTS

It has already been mentioned as an instance of Government control that from the earliest years Parliament has required the railway companies to make financial and statistical returns to the Board of Trade. This, however, is not the full extent of the control exercised. The form of accounts to be issued to shareholders and the periods at which they shall be issued have also been laid down by Acts of Parliament. For some time it was complained that the form of accounts and statistics thus required was bad. It was impossible to obtain anything but a very vague approximation of the various costs of transport (the cost of actually moving goods, or passengers), of the maintenance and repairs which arise from doing this work, and of the many incidental expenses attributable to the various departments of railway working. It is not surprising, therefore, that the form of accounts was severely criticised by writers in the technical and lay press and sometimes by shareholders at half-yearly meetings. For a long time criticism and agitation seemed futile, but in June, 1906, the President of the

Financial and Statistical Returns.

Board of Trade appointed a departmental committee "to consider and report what changes, if any, are desirable in the form and scope of the Accounts and Statistical Returns rendered by Railway Companies under the Railway Regulation Acts." The committee reported in May, 1909. Since those days the Ministry of Transport has been created, and acting under its wide powers has had no compunction about ordering the companies to prepare and publish many figures which the 1906 committee hesitated to recommend, although some of the members were in favour of them. Much that the committee did, therefore, has been superseded, and the whole question of the usefulness or otherwise of the figures has been summarily disposed of, but that does not render uninteresting the theories which lie behind them, and so as the committee's report set out the arguments for and against, it is useful to retain the

Departmental Committee of Board of Trade.

review of its recommendations which appeared in the earlier editions of this volume.

The sections of the committee's report dealing with the form of financial accounts raised little, if any, controversy. One of the first recommendations was that in future the accounts should be annual. Until 1911 they were issued each half-year, half-yearly dividends were recommended, and half-yearly meetings of stockholders held to consider and confirm the reports. Outside these old companies (such as railway, canal, water and gas companies), incorporated by special Acts of Parliament it is difficult if not impossible to find parallel instances. In the case of limited companies the invariable rule is to submit accounts and hold a meeting of shareholders once a year. It is, however, almost as invariable to find dividends declared half-yearly, that which is not declared at the annual meeting being called the interim dividend. But although reports and accounts are only issued once a year it is customary for directors of companies to have before them approximate accounts for the half-year when considering the declaration of an interim dividend. The departmental committee recommended that if the system of annual accounts was enforced by Parliament on the railway companies power should be given to the directors to pay interim dividends. Equally as important from the statistical point of view was the further recommendation of a uniform date for the closing of all railway accounts, in other words, that they should all close their year on the same day. The final recommendations of importance in this connection were designed to secure the separation of the income arising from railway working proper, from that derived from subsidiary enterprises, such as the working of docks and hotels, and to separate the earnings received from joint lines. Equally important were the scheduled forms of accounts devised by the committee, which prescribed the manner in which all these various details were to be separately dealt with in their own special accounts, and then brought into the general account of income and expenditure. They were well contrived to secure the desired separation of the revenue results of railway work from those of the subsidiary undertakings.

When the committee came to deal with the non-financial side of the statistics, however, the subject became much more controversial.

There were, of course, many things which were accepted without question, such as returns of the mileage run by engines, the number of the various kinds of rolling stock, the number of passengers carried, and the receipts in each class, the number of tons of minerals and merchandise carried and the receipts, and the train miles run both loaded and empty. This latter division was new and of special interest as showing the extent of the mileage of return journeys which empty trucks have to be hauled, and, of course, hauled unprofitably. It is a condition which arises extensively in connection with coal traffic. Railway, as well as privately owned trucks, are hauled from the coal mines to the point at which they are to be emptied and then go straight back again empty to the mines to be loaded again. It is not uncommon to find numerous trucks that never do anything else but move between two given points. An instruction is painted on them permanently that when empty they are to be returned to a specified colliery. The returns now take account of this movement of full and empty trucks.

**Non-Financial
Statistics.**

An acute difference of opinion arose as to whether the committee should recommend the adoption of ton mile and passenger mile statistics. By many critics a ton mile and a passenger mile are regarded as the most perfect units of railway service that can be devised. They combine the two important things—weight or numbers and distance. Thus, 1 ton carried 1 mile gives one ton mile, while 10 tons carried 10 miles give 100 ton miles, and similarly with passengers. Given this data, it is astonishing what a number of ingenious combinations can be worked from the remainder of the material to be found in the statistical returns. The departmental committee mentioned the following as “the more important statistics deduced from ton miles and passenger miles”—

**Ton and
Passenger Miles.**

(1) The average train load of goods and of passengers, obtained by dividing the ton mileage and the passenger mileage, respectively, by the train mileage.

(2) The average wagon load and the average carriage load, obtained by dividing the ton mileage by the wagon mileage and the passenger mileage by the carriage mileage.

(3) Ton miles per engine hour.

(4) The average length of haul for goods and passengers,

respectively, obtained by dividing the ton mileage and the passenger mileage by the total tonnage and the total number of passengers conveyed.

(5) The average receipts per ton per mile and per passenger per mile, obtained by dividing the goods receipts by the ton mileage and the passenger receipts by a passenger mileage.

(6) The average density of traffic per mile of road or mile of track, obtained by dividing the ton mileage and passenger mileage by the length of road or by the length of track.

Foreign and colonial railways have adopted ton mile statistics, but in the past the only English railway which compiled them was the old North Eastern. The old North Western and Great Western companies used to do so but abandoned them as, in their opinion, not worth the trouble and labour expended upon them. This latter statement may be taken as indicative of the attitude of all the English railways. Inside opinion mostly pronounced against their usefulness and value. Opinion in favour of their adoption included a minority of stockholders and most writers on financial and commercial subjects in the daily and weekly press. One of the most common arguments used in discussions as to the burden of railway rates, whether it is heavier in Great Britain or abroad, is based on the use of the United States ton mile figures, and as there was nothing of the kind published in this country, exact comparison was impossible and its absence seriously hampered discussion. It is obvious, of course, that ton mile statistics cannot possibly be the panacea for all the ills from which the railways are often alleged to suffer. After all, a ton mile rate is but an average, subject to all the defects of an average, covering a multitude of widely divergent things and conditions, and exactly representing none of them. It does not follow that because the average rate per ton mile for the four principal railway companies is now shown to be 1·439d., the goods managers can afford to carry things such as bicycles (which, though relatively light in weight, take up a great deal of space and are awkward to handle) for an average rate of 1·439d. per ton per mile. An exactly similar argument would apply to furniture of the better kinds, or to motor-cars, or light horse vehicles. It may be that by far the greater part of the traffic consists of compact heavy things which load into trucks with the minimum of wasted space. Of course, such

The Railway Attitude.

uniformity of traffic is exceptional, but it is quite possible for a railway with an immense coal and mineral traffic to get a very low average ton mile rate. What would be the value of knowing that the average ton mile rate is, say, one halfpenny when a request is made for an exceptionally reduced rate for a large consignment of bicycles, or valuable furniture, or any goods which combine lightness with exceptional size? To rely solely on a low average ton mile rate under such circumstances would be to court an unprofitable transaction. It is obvious, therefore, that while ton mileage figures may be useful, or interesting, they are not infallible.

But let us take some of the arguments for and against set out in the report of the Departmental committee. Considered from the point of view of management and control, it is admitted, the committee said, that "large average statistics, such as those based upon ton miles, which can only be obtained some weeks after the period to which they relate, can in no way be used to replace rough and ready statistics which are immediately available. Many witnesses emphasised the necessity of continuous supervision and check by subordinate officers in order to secure the efficient loading and economical working of trains. They expressed the opinion that the information furnished by the daily dissection of guards' journals, by daily and weekly records of the loading of trains and wagons, and of the tonnage at principal stations, by the average earnings per goods and mineral train mile, and by similar detailed returns, is quite sufficient for the proper working of a railway without the addition of ton mile statistics. They further declared it impossible to replace by ton mile statistics the existing system of supervision." The committee, however, did not think it followed that ton mile statistics are useless, but that while a general manager, for instance, might not find it possible to dispense with detailed figures, yet statistical information for use of the higher officials must be given in a more concentrated form than that prepared for the use of subordinate officials engaged in the detailed operation of the line.

In a series of paragraphs the report compared the value of ton mile statistics with receipts per train mile as a measure of efficiency in railway working. It pointed out that "while in so complicated a business it is plainly impossible to assemble in a single figure the record of the whole work performed, some useful purpose is served

by statistics, which, from their comprehensive nature, may be used to indicate in a general way the condition of the business from year to year. At present the only figure of this kind available is the average gross receipts per train mile. Such a figure, however, is only reliable so long as the average rate remains constant. A rise in it may be due either to improvements in loading, to increases in the rates charged, to an increase in the average length of haul, or to an alteration in the relative proportions of high-class and low-class traffic. The average train load in tons is a more reliable figure for such comparisons." The general conclusion they drew was that as a measure of efficiency, statistics as to the average train load give information which is not afforded by figures showing the average receipts per train mile.

Another advantage claimed for ton mile statistics was that their employment would result in more attention being paid to the proper loading of every train and every wagon. The railway witnesses, however, were mostly of opinion that this purpose was adequately served by the detailed returns as to loading, etc., taken out by the British railways, and that the average wagon load based on ton mileage was a fallacious figure likely to mislead in that it did not represent the load per journey.

It was alleged that the use of ton mile statistics led to undue concentration of attention upon the securing of heavy loads, to the detriment of public convenience, and to the delay of traffic for the purpose of getting full loads with a view to the production of a higher figure for the average load.

The committee admitted that practically no instance was brought to their notice of any definite increase of earnings or decrease of expenditure in any specific case which was the result of the use of ton mile figures and which could not, or ought not, to have been brought about by other means. In view of the fact that these statistics are large averages, however, the committee did not regard this as inconsistent with their general utility in relation to railway control. They admitted that it was difficult to see in what way the average rate charged upon all classes of goods on every section of the line could be usefully employed in arriving at a decision as to what would be a suitable rate for a given commodity to be carried for a given distance. At the same time it was probable, they reported,

that the average rate would constitute a useful item of information to be carried in the mind when dealing with the rate to be charged for any particular class of traffic. The opinion was also expressed that average statistics must not be employed for purposes for which they are not fitted, but there was evidence that they might be rendered more useful if compiled not only for all classes of goods traffic over the line, but for separate commodities or groups of commodities, over the whole line and over different sections of the railway. With regard to cost, the evidence was conflicting as to how far it was practicable to divide, with some approach to accuracy, the expenditure common to both passenger and goods traffic.

Considering the subject from the point of view of shareholders and of general statistical information, the committee reported that they had not found evidence of a widespread demand for ton mileage figures. “Although they are a record of work done in a sense in which train miles are not, they are imperfect in that they take no account of such important things as terminal charges and make no distinction between the various classes of traffic.” For instance, 10 tons of coal carried 100 miles in one truck and 10 tons of furniture carried the same distance, but in several trucks, would both be represented by 1,000 ton miles. As a measure of the actual work performed in carrying goods from point to point, however, such statistics constitute a source of information which would be of value not only to railway shareholders but to the public at large. An important point in favour of ton mileage, it was pointed out, is that it affords a means of judging, over a period of years, the variations in the average loading of trains and wagons, in the average length of haul, in the average density of traffic, and in the average rates charged by the companies.

The committee also said there was reason to think that a knowledge of the average rate per ton per mile charged by English railway companies would provide material for a more definite answer than could be given to the charge, sometimes brought against our railways, that English goods rates are the highest in the world. A more just comparison of the level of the rates in this country and in the United States of America would be rendered practicable if it were possible to produce actual figures to show the average haul in this country.

**Shareholders’
Point of View.**

**Useful for
Comparison.**

If, as is probable, the average haul here were found to be at most one-fifth or one-fourth of the average haul in the United States it would follow that a comparison of the average rates charged in the two countries would not be fair without taking into account the fact that the terminal charges in this country are a far larger proportion of the total rate than in America.

Some witnesses were apprehensive of the use to which the statistics might be put by persons seeking material for factious criticism of the railways, if the publication of such figures were required. One, indeed, thought it probable that if the average goods rate were published traders would try to use it against the railways ; but evidence given by other witnesses seemed to suggest that the advantages of comparison would outweigh these dangers.

It was frequently urged by the representatives of the railway companies that the conditions peculiar to British railway business were such that ton mile statistics were quite unsuitable for use in this country. The objections fall mainly under three heads :—(1) The great difficulties which stand in the way of actual compilation in this country ; (2) the circumstances which would render the statistics, if obtained, especially inapplicable as tests of efficiency or as a record of work done ; (3) the expense of compilation without corresponding advantages.

The committee, in conclusion, expressed the opinion that such statistics would be useful, but they did not recommend their adoption in face of the railway opposition and the absence of any considerable demand for them by shareholders and the public because “a large part of their usefulness might be lost if their compilation resulted solely from compulsion.” They were also of opinion that, however useful they might prove from the point of view of general information, there was not sufficient ground for insisting on their being compiled by all companies unless and until they came to be adopted by a considerable number of the important companies.

There were two minority reports. The first, a short one, was signed by three of the members who desired to make ton mile statistics compulsory on the ground that they stand on the same footing as other accounts and should equally be made statutory ;

that they know no reason why a large part of the usefulness of such statistics might be lost if their compilation resulted solely from compulsion, and that sufficient weight had not been given to the interests of the public which in this matter coincide with those of shareholders.

First Minority Report.

“ If the control of the Board of Trade and of Parliament over the railways is to be wise and salutary it must be based on adequate knowledge. Adequate knowledge cannot exist until comprehensive information is produced showing the total amount of the work done by the Railway Companies for the public and the average charge made to the public for doing it.”

Finally, they recommended the adoption of schedules drawn up for the purpose of eliciting ton mile and passenger mile statistics.

Three other members signed a second and much longer minority report, the whole tenor of which was directly opposed to these statistics.

Second Minority Report.

Briefly put, their objections were that “ averages ” are of no use whatever in enabling railway officials to determine the efficiency of the service, and cannot displace day to day control. “ The evidence submitted to the committee tended to prove the uselessness of the ton mile rather than its utility as a measure of efficiency. It is of importance to remember that this form of statistics has been tried and found wanting by two of the principal railway companies in Great Britain, viz., the Great Western and the London and North Western. The English railway managers who have formerly controlled railways abroad or in the colonies, where this statistic has been compiled, have come to the conclusion that it is useless in this country.” The publication of such information would lead to misleading comparison between railway companies and between different periods for the same railway company. The really important commercial consideration must always be the money earned by a train rather than the number of tons of varying descriptions of merchandise which it contains. A moderate estimate of the cost for ton mile statistics alone for all the railways, would, in their opinion, amount to at least £35,000 per annum.

The outcome of the committee's report was the passing of the Railway Companies (Accounts and Returns) Act, 1911. This Act followed exactly on the lines of the report. It adopted the skeleton forms of account which appear in the schedules agreed upon by all the members of the committee, but excluded ton mile and

passenger mile statistics. It made annual accounts compulsory, fixing 31st Dec. as the day for the termination of the year, and removed the obligation to prepare half-yearly accounts and hold half-yearly meetings. On the whole it will probably be admitted that the Act made a long step in a desired direction. The 1911 Act came into operation on 1st Jan., 1913, and the war began in August, 1914, entailing the suspension of many things in addition to the publication of railway figures, with the result that for several years there is no information available. Since 1920 when the newly created Ministry of Transport came into control all these variations of ton mile figures have been compulsorily imposed on the companies. They have been issued for the last five years, but circumstances have conspired to rob them of some of their value as a measure of the efficiency of railway management and operation. The period of their existence is the period which covers the whole of the extreme alterations in railway rates, both upwards and downwards. But though they do not help to solve the question of efficiency, they afford some evidence of the weight of transportation charges which British goods have had to support. For instance, the average receipt per ton per mile for all descriptions of traffic in the five years 1921 to 1925 inclusive has been, beginning with 1921, 2·076d., 1·714d., 1·467d., 1·419d., and 1·439d. The latter increase, it may be suggested parenthetically, may be due to the decline in the tonnage for 1925, whereas the tonnages had shown an increasing tendency in the other years. When all the disturbances due to variations in rates have disappeared and the traffic is being worked under more stable conditions, there will gradually be built up a series of comparative figures which, within their limitations, should be of value to every one interested. But even now some of the men engaged in the exacting business of railway operation do not think so. They still regard them as more or less "faddy" and unnecessary; as occupying a lot of their time (and that of their staffs also) which might be applied more usefully to obtaining and working traffic; and as costing a lot of money for very little purpose. Probably it will be a long time yet before their utility or indispensability are admitted, if they ever are.

CHAPTER XI

STATE RAILWAYS

IN the United Kingdom of Great Britain, in the United States of America and in Canada the railways are the property of, and are worked by, joint stock companies. In Europe (to a very large extent), Australia, and South Africa they are the property of, and are worked by, the various States. It may be wondered why there should be this marked difference. Questions of principle, or of public policy had something to do with it, but in the main these questions did not obtain recognition until long after the establishment of railways, and the explanation of the difference in ownership must be sought in other directions. So far as this country is concerned, the development of railways under private ownership was largely a matter of circumstance. At the time when the first steam railways (railways as we know them in the modern meaning of the word, as distinct from the original and primitive forms), were being established, the economic mind of the nation was rapidly tending all in one direction ; the direction of individualism. Adam Smith and his successors had preached the doctrine in opposition to the system of close State supervision and regulation that had prevailed in their day and earlier. Individualism was almost, if not quite, the beginning and the end of their doctrine. They propounded the theory that the State was not fitted either to conduct or to regulate business undertakings. If nations were to attain their fullest measure of commercial and industrial development and success, the less the State interfered the better. Individuals, if left to themselves and freed from the hampering restrictions to which they had been and were subjected, would pursue a policy of self-interest. Each would devote himself to the work for which he was best fitted and for which his circumstances, natural or acquired, were most favourable ; and as a consequence commerce and industry would develop on natural lines and attain the greatest possible measure of prosperity. This policy has been variously called the policy of enlightened self-interest, individualism, Free Trade, or *laissez-faire*.

Concurrently with this development of economic opinion and the gradual putting of it into operation the industry and commerce of the country were expanding rapidly and wealth was being accumulated in greater volume than ever before. The capital required for railway construction and equipment was available, and as its possessors had the required enterprise to apply it to that purpose, State assistance or State ownership were unnecessary. Many mistakes were made in those early days. There was much that in later times would have been called "wild cat speculation"; schemes were promoted for which there was no demand, no real reason, and which had no possible prospects of ultimate success; and the capital invested in them was wasted. Such are always the penalties attending the initial stages of new industries under an economic organisation such as ours. And the projects to which these criticisms did not apply, which were destined ultimately to be successful, were not without their faults. To mention but one of them—they were relatively too parochial, or too provincial; they lacked national scope and completeness. It was thought sufficient, for instance, to construct a railway from London to Birmingham, and another from Birmingham to Liverpool. These now form part of the immense system of the London, Midland and Scottish. And there was a short railway from Leicester to Swannington; a small place within the county of Leicester, intended for a purely local service—the transport of coal to Leicester. Parliament did not help any of these schemes; it neither found them capital nor land, nor even helped them to acquire land on reasonably low terms. It did not interfere, except in ways which now seem open to criticism, because, instead of facilitating the construction of railways, it really made their initiation and creation more costly than ought to have been the case. The railway systems of to-day might possibly have been better (though the possibility is not to be accepted as a certainty) had there been State construction and ownership. The State might ruthlessly have cut down the exorbitant demands of landowners; certainly the preliminary expenses of promotion would have been less than they were. The railways might have been less heavily burdened with capital, and the systems might have been laid out more comprehensively on national lines and with less duplication and overlapping, had we been given a State system rather than

**Why British
Railways are
Privately Owned.**

private systems. Even these advantages, however, are not admitted by the critical opponents of State railways. But if Parliament had exercised a wise controlling hand ; if it had been less jealous of its own powers and privileges and had given to some specially created body power of inspection, supervision and direction we might have had a better national system ; one less expensive and one in the evolution of which less wealth would have been wasted. But, as has been said, Parliament only interfered in ways that are now criticised ; ways that added to the original cost.

Notwithstanding all this, however, the system, or systems, evolved were until quite recent years the subject of national pride and foreign envy. Great Britain had obtained a national system comprehensive, efficient, and prosperous, which cost the State (in other words, the taxpayers) nothing, which was and is a large source of revenue¹ to the State chiefly in the sphere of local, or municipal government, and which in addition has been a source of profit to investors.

Foreign experience has been very largely, though not quite entirely distinct from this. It is now customary for controversialists to

European Policy. speak of Continental State ownership of railways as the outcome of an enlightened national policy having clearly in view the requirements of the nations in question. According to this view the European governments either constructed or acquired their railways because they desired to work them, say, in conjunction with, and as supplementary to, the national system of protective import tariffs. The argument is that if the governments desired to shape the development of their natural resources and to promote national industry and commerce, it was futile to leave privately-owned railway companies with the power to modify these protective measures by such things as low rates for imported produce carried in bulk. There seems to be no possibility of doubt that in the case of Prussia these, or similar ideas, had their influence in shaping the national railway policy ; it is not questioned that the Prussian railways were acquired and have since been extended and conducted with the object of facilitating national development.

¹ The amounts paid as rates, taxes, and Government duty by British railway companies in the last five years given in the returns were : 1921, rates, £10,783,675 ; taxes, £20,183 ; duty, £184,387 ; 1922, rates, £8,355,477 ; taxes, £12,406 ; duty, £477,877 ; 1923, rates, £7,881,547 ; taxes, £8,254 ; duty, £443,877 ; 1924, rates, £7,654,773 ; taxes, £9,443 ; duty, £421,703 ; 1925, rates, £7,624,442 ; taxes, £7,888 ; duty, £419,521.

Another argument advanced is that the States became the owners of their railways because they desired to hold the balance evenly between traders, to help traders by working at the lowest possible rates, and to work also in the interests of the railway employees. But when the history of the railways comes to be enquired into there is a distinct suggestion that these fine altruistic theories are in the main mere afterthoughts developed in the light of subsequent experience, which itself was shaped more in conformity with the demands of shifting public opinion, than a perfected theory such as that now put forth ; that the States took over the railways not always because they wanted them, or because they had any of these theories in mind, but because, for financial reasons, they had to ; because private railway finance broke down. In " new " countries, such as Australia, quite different considerations have actuated governments. The natural resources of new countries can be opened up much faster with railways than without them. With a population still small and natural resources merely latent, private enterprise is not always very ready to find capital for railways, though the experience of the United States of America furnishes a conspicuous example to the contrary. In the main, therefore, new countries, if they were to have railways on at all a comprehensive scale, if they were not to wait long for them, and if the opening up of their natural resources was not to be a slow process, had perforce to make their own railways ; and at the outset their taxpayers had to pay for them indirectly.

It will be seen, therefore, that different countries pursued the policy best suited to the conditions prevailing at the time, and, as has been said, it is only within quite recent years that we have heard any suggestions that the British system, both physically and theoretically, is not the best. That, of course, may be but another instance of our national insularity, but still it is so. Why then the change in opinion, partial though it may be ? Why the loss of the prevailing satisfaction ? Why the criticism of private ownership ? Why the suggestion that State railways would be an infinitely superior thing ? No simple comprehensive answer can be given to those questions. The change has come because of a variety of reasons. For one thing there has been an immense change in opinion as to the directions in which the State may usefully act. We are no longer

**Altruistic
Afterthoughts.**

**Why the Change
in British
Opinion ?**

individualists in the former acceptation of the term. It is no longer held that a policy of enlightened self-interest is all sufficient. The State has stepped in gradually to regulate first one sphere of industrial or commercial activity and then another until at last the idea of such interference has become so familiar that the majority accept it unquestioningly as something quite right and necessary. From being individualists we have become more or less socialists, although we may not wear the red tie nor subscribe to some socialistic organisation. And the socialists themselves have helped to familiarise the public with the idea by preaching

**Spread of
Socialism.**

State ownership insistently in season and out of season. We have become used to the idea of a State postal service, a State telegraph service, and now State telephones. From these to State railways is but a more or less large progression according to the mental constitution of the individual. The growth of international competition has been another cause of the change. As business men have had to fight harder and harder to maintain their markets, not only abroad but also at home, they have, especially in the latter connection, looked closely for reasons why foreign goods can reach the inland towns of England on such extremely favourable competitive terms. Among other things they have found the very low combined rail and shipping rates from the countries of origin. Naturally, when they find their competitors deriving so much assistance from bounties in the shape of reduced rates given by State railway systems, they are apt to regard those systems as something eminently to be desired. There is much misunderstanding on the subject, as will have been seen from the earlier chapter dealing with the allegations that the British railways grant preferential rates on foreign imported produce ; but when the misunderstandings are cleared away the fact remains that European State railways do grant reduced rates on domestic produce exported from their country and not on that which is imported. British railways, on the other hand, grant reduced rates both ways, and, purely as circumstances are, it happens that the reductions on imported goods are taken most advantage of ; at any rate, more is heard of them than of the reductions on exports. In this way there has developed a party in favour of the nationalisation of British railways.

Another force influencing opinion in the same direction has been

the attitude of trade union labour. To a much larger extent than ever before the trade unions are permeated with socialism ; but this

**Influence of
Trade Unionism.**

is not their aspect to which reference is intended : it is the call for State regulation of and intervention in labour conditions. In recent years this has been so loud and insistent as not to be denied. This intervention originally may not have been completely successful from the labour point of view, but still it has not been without its effect on railway working. Its culminating point was reached when the Government stepped in to end a strike by setting up Wages Boards, which have since been elaborated and placed on the companies as a statutory requirement of the 1921 Act. Its effect is twofold. It encourages the aspirations of railway labour for a State-owned system under which it is believed conditions of work will be infinitely superior to anything experienced in the past. Under such a system the railway employee hopes to get, and believes that he will get, a shorter working day and increased payment. On the other hand, the opinion has been expressed that the continuance of this kind of interference will place such a burden on the railways, that ultimately the state in common justice to the present stockholders, who have become financially interested solely as investors, and from a business point of view, must acquire the railways and work them along the lines of policy recently developed.

Finally, another circumstance has been pointed to as working in the direction of nationalisation—what has been described as “the breakdown of competition.” It cannot be main-

**“Breakdown of
Competition.”**

tained that competition between the various companies working in the same territory has altogether ceased. In a variety of ways it exists and the public derive benefit from it. And as long as two independent companies serve the same district there must always remain a basis of competition in their working. It may not be very active, but there it is. To mention but one instance, there is always the fact that the shorter distance will govern the rate or fare as the case may be. But while this is so there has been in recent years a very great advance in the direction of eliminating competition. First, there were the working agreements made between groups of companies to “pool” traffic in districts where their interests had hitherto clashed. As examples of this may be mentioned the arrangements made by the old London and North

Western and Midland companies in respect of season tickets, etc. Where the two lines both touched two towns the holder of a season or contract ticket between these towns might use either line indiscriminately, no matter with which company his contract might be made. Similarly, certain kinds of carted goods traffic would be collected by the carts of either company. In the treatment of claims the existence of these working agreements enabled the companies to act together ; in fact, there is now a Clearing House joint claims committee. Not less important was the reduction in competing services which the agreements enabled the companies to bring about. In short, the agreements, it was believed, enabled the companies to effect considerable economies. From the public point of view the question was : What will this develop into ; where will it end ? The answer to this question, which was written in 1914, was supplied in part in 1921 by the Act which created the four great amalgamations, and so was diminished the competition which Parliament relied upon to obviate the necessity of close regulation for the protection of the public against the possibly bad effect of quasi-monopolistic conditions. The regulative force of competition has not entirely disappeared. There are still numerous towns, not always very large or important, served by more than one company, but, of course, the reduction in the number of companies has inevitably reduced competition, and, subject to the restraint exercised by the Ministry of Transport, facilitated the making of working agreements. The question has been asked whether the State is capable of exercising the extended and more intimate supervision required to replace the lost influence of free competition ; and if it is, ought it, in justice to the stockholders, to be exercised ? Some of the foremost authorities on what may be called railway politics, men of recognised ability who have considered the question from this point of view, are of opinion that the elimination of competition means ultimately that the State must take over the railways and work them. Some are not enamoured of the prospect. They believe that under State ownership there would be a loss of efficiency and that quality of adaptability so essential to their conduct on commercial lines ; and they believe that financially also there would be loss of efficiency ; that the bargain must inevitably be a bad one for the State. Yet they believe that in the eventualities foreshadowed, nationalisation must come.

It must not be assumed from this outline of the development of opinion that there is as yet a majority of the population in favour of nationalisation. Whether there is or not has never

**Arguments for
Nationalisation.**

been tested, and possibly there will never be any direct test. But it is certain that originating in a variety of circumstances, and developing along the lines indicated, there has been a distinct growth of public opinion in favour of State acquisition and operation. The arguments advanced in favour of State action may be briefly summarised under the five following headings—

(1) The socialists would welcome it because it would be a large step forward towards the attainment of their ideals.

(2) Some traders desire it because they believe it would be possible to obtain reduced rates and fares through the systems being organised with a greater regard for the requirements of commerce rather than the earning of dividends.

(3) Some favour it because they believe that the profits realised from a national industry such as transport should be applied to the relief of taxation.

(4) Social reformers look to it as a means of helping their schemes for the rehousing of urban populations in suburban and rural districts.

(5) Labour organisations look to it as a means of securing better working conditions, shorter hours, and higher wages.

One brief, simple reply is often made to these reasons—that they are mutually destructive. If the railways are to be nationalised and

**Mutually
Destructive
Reasons.**

used as instruments for the accomplishment of social and labour projects, then they can neither be expected to realise a profit for the relief of taxation, nor to give reduced rates and fares to the trading

and travelling public ; and, of course, this line of argument applies conversely. But the subject is much too large and important for a series of arguments such as these to be disposed of so summarily. It is, of course, true that all these ends cannot be attained concurrently with complete success. The real question is as to whether State ownership is desirable. When, and if, that is decided affirmatively, will come the question as to which line of policy is to be pursued—are the railways so acquired to be worked for a profit in relief of the National Exchequer, or are they to be worked

for the benefit of trade, labour, and the social advancement of the nation ?

Advocates of nationalisation from the business point of view seek support for their arguments principally in the experience of Prussia and Belgium. The case for the affirmative in connection with Prussia was very ably put by Professor Hermann Schumacher¹ in a paper submitted to a Congress of the Royal Economic Society in January, 1912. Very briefly summarised, his argument was that the Prussian railways were not nationalised for either military, commercial-political, or financial reasons, but to make them subservient to the economic interests of the nation. While private enterprise provided adequately for the industrial west, the agricultural east, not proving so attractive to privately owned capital, was poorly served. State ownership enabled this inequality to be remedied. It also made possible the abolition of differential rates such as occur under private ownership, and thus gave the State the opportunity of securing the measure of uniform treatment necessary to secure the even and widespread development of the resources of the country, both natural and human. The author of the paper claimed that the nationalisation of the Prussian railways had fulfilled every expectation. It had saved the German people thousands of millions of marks ; it had removed the evils connected with differential railway rates ; it had enabled the Government to foster a policy of industrial development ; it had offered almost unlimited scope for economies. Financially, the results were described as magnificent. The gross working profits had risen from 222,000,000 marks in 1883 to 548,000,000 in 1908, the aggregate since nationalisation had been 12,000,000,000, and after payment of maintenance and preservation expenses out of revenue, a total of nearly 3,000,000,000 marks out of the surpluses had been placed at the disposal of the State for other purposes.

At the same Congress Professor Ernest Mahaim (Liège) dealt with the experience of Belgium, where the State, for politico-economic reasons, constructed and worked the main lines and left others to private enterprise, but ultimately had to take over most of these private companies " for reasons of general policy and to secure the economical working of

¹ Professor of Economics in the University of Bonn.

the railways." He claimed that under the State the railways had been worked to promote the industrial and commercial expansion of Belgium, but at the same time they had been worked as a service which should neither be a national charge, nor a fiscal expedient, but which should be required to cover its expenditure by its earnings—*i.e.*, at cost price. As an illustration of this he mentioned that from 1835 to 1908 the average annual profit had worked out at 0·054 per cent.

The State railways of Holland and Denmark do not, as a rule, furnish many arguments for the controversialists. In both countries

**Holland and
Denmark.**

the systems have to work in competition with very considerable facilities for transport by water and have to do their work cheaply in order to obtain any traffic. And it seems to be generally admitted that in the early days of railway enterprise capital was not attracted to either country with the result that failing provision by the State both would have been faced with the alternative of possessing no railways or of having to wait a very long time for them.

Australia and South Africa are used as examples of State action

**Australia and
South Africa.**

to promote the development of "new" countries and of the manner in which a necessary service can be given to regions, or districts, which the private capitalist would not contemplate as offering a favourable investment.

As there are two sides to every question, so we find, when the arguments of opponents of State railways are considered, that a very

**Criticism
of German
Results.**

different opinion is entertained concerning all these national systems. In the case of Germany it is admitted, even by supporters of State action, that nationalisation has proved a bad bargain for the smaller States because their systems are not large enough to permit the best results to be obtained. The Prussian railways, from the point of view of the critics, are anything but what they are made out to be. They admit, of course, that German export trade has received incalculable benefits from the specially low rates made with the object of extending it. But when it comes to the internal movement of merchandise they contest, point by point, the arguments that German traders are better served than British when actual conditions are properly contrasted. Their assertion is that

the low German rates often quoted against British rates, to the disadvantage of the latter, are for an infinitely inferior service which does not include collection and delivery (for which separate charges are made by forwarding companies altogether independent of the railway companies), and that the service performed by the railways is solely that of haulage and at much slower speed than that attained in this country ; slower speed not so much in actual travel along the railways but in the time occupied from handing in to delivery. Where quicker delivery is required higher rates are charged. It is also asserted that less liability is taken for loss, damage, mis-delivery, and delay than is normally accepted in this country. Equality of treatment, upon which so much stress is laid by advocates, is also criticised. Of course, unjust preference is denounced by the critics, but they contend that equality of treatment under State systems becomes too rigid ; that it does not allow of sufficient elasticity in dealing with special circumstances ; and that if railway rates were always framed on this basis in regard to distances there would often be cases where manufacturers were excluded from markets that otherwise are available to them when the system pursued is that of " charging what the traffic will bear." The favourable financial results upon which the other side lay stress are alleged to be due to the starvation of the system ; if it were kept in as efficient a state as it ought to be, such as that maintained by British and American railways, then the financial results would be very different. A greater contrast than that afforded by these two sets of opinions it would be difficult to imagine. Fortunately the object here is merely to state them, not to pronounce judgment upon them.

Conditions in Belgium are subjected to quite as severe criticisms of a different kind, though one of them is similar—the financial aspect. An average annual profit of 0·054 per cent. (fifty-four thousandths of 1 per cent. !) in seventy-four years is regarded not merely contemptuously, but questioningly. Apply the position to any business. Would the proprietors of any concern which made such a microscopical profit over such a period of years consider that they had made such a profit at all ? Rather, it is suggested, they would seriously consider whether they had not really made a loss in view of the intangible things such as depreciation, the calculation of which

**Special
Circumstances
of Belgium.**

can never be made exact. There has been a great deal of criticism directed to the Belgian railways (some of it apparently very sound criticism), and one of the points made is that no one can possibly say that they have made an average profit of even fifty-four thousands of 1 per cent. because the accounts are so confused and unsatisfactory that it is impossible to say what is the amount of the capital employed, or the real expenses of the railway. The critics are more definite when they deal with the abuses to which they assert State ownership gives rise. These are in the nature of indirect bribery and corruption for the purpose of securing votes. It is stated that in Belgium the existence of a large class of railway employees who are also voters, has led to the over-staffing of the railways and to the treatment of the staff on lines which would not be countenanced on privately-owned railways. Also it is stated that because of the same political influence money has been lavished in one place on such things as station accommodation and equipment while other places have been starved.

The manner in which these criticisms of Belgian State railways, written in 1914, have been justified by the announcement, published in 1926 (to which reference has already been made), that Belgium has found it necessary to turn over the State railways to a new company, is remarkable. Ostensibly this is one of the measures adopted for the rehabilitation of the franc, but, according to *The Times* special correspondent: "It has a wider general interest as being a striking confession, based on experience, of the incompetence of State management." The correspondent adds that, in spite of admirable technical handling, the net result in last year's (1925) Budget was a deficit of more than 95 millions of francs. As to whether the new company can make the railways profitable he says: "It is in the first place obvious that the extent to which profits can be realised must depend on how far the new organisation is really 'strong and independent,' how far it will be able to free itself from the incubus of political interference in the management. It is at the outset not very encouraging that the same section of the preamble (the preamble to the new law authorising the transfer to the company) states that this 'strength and independence' of the company is to be combined with the 'maintenance of the essential rights of control possessed by the State' and with 'guarantees of their vested interests to the numerous and loyal staff.'" Much

more might be quoted, but these passages are sufficient to form a illuminating commentary on the subject as far as Belgium is very concerned.

France furnishes the strongest argument of the opponents of nationalisation. From the very first the French investor fought shy of railways, and in the end the Government found it necessary to undertake the work of constructing the road-bed, bridges, stations, etc. Concessions were then made to companies who were to lay the rails, provide rolling stock, and work the railways. In this way the main lines of France were provided and the impetus thus given to development encouraged private enterprise. To trace the subsequent history with all its vicissitudes would involve detailed treatment such as is unnecessary to the purpose immediately in view, but ultimately among other things the State had to extend the term for which concessions had been granted and to guarantee interest on capital. For a long time it also worked a short line (3,000 kilometres), and of this experiment it has been stated that the management was "generally considered of a mediocre and unprogressive character,"¹ while "from the financial point of view the results given by the old State railways have always been bad." On 1st Jan., 1909, the State took over the Western Railway, which appears to have been a most unsuccessful undertaking, never earning sufficient net revenue to enable it to dispense, as did other companies, with the State guarantee of interest. Concerning this experiment M. Leroy-Beaulieu writes that State management in 1911 cost the taxpayers 50,000,000 francs more than the worst year, and 62,000,000 more than the average year, of the old company. From 1909 to 1911 gross receipts rose from 219·3 to 231·4 million francs, working expenses from 152·8 to 207·3 millions, the net product fell from 66·5 millions to 24·1 millions, and the deficit on capital charges rose from 35 to 77·4 million francs. Four-fifths of the increased expenditure, it is pointed out, is on account of expenses of personnel, and the author states that it is due to an excessive increase in numbers which he attributes to political influences. He also criticises very severely the inefficiency, ineptitude and rigidity of the management. Perhaps the most striking illustration

¹ M. Pierre Leroy-Beaulieu's paper at the Royal Economic Society's Congress.

of this which he gives is contained in the following quotation, taken from the letter of a stationmaster read in the French Chamber—

“In the time of the Western Company we stationmasters had orders to use the rolling stock as quickly as possible, and to send to a given station all that we did not ourselves require. Under the State all is changed. Every stationmaster is forbidden to load any wagon without the orders of the distribution bureau of the district. This bureau is, as is well known, a new creation specially designed for the purpose of finding situations for so many more bureaucrats. Recently, having received two wagons loaded with horses, accompanied by an order to send these wagons to Caen after they were unloaded, I thought to do well by loading in these two wagons 200 sacks of grain, which had been waiting in the sheds for several days to go to Caen. But, alas, I did not know the bureau of distribution. The next day I saw my two wagons return, and I received at the same time an order to unload them. I was reproved into the bargain for excess of zeal. I had to obey the order. That evening I sent the wagons empty to Caen. Next day I received two others also empty, into which to load the grain.”

One other quotation may be given from the same source—

“Complete disorder, in fact, reigns in the administration of the State railways. This administration, which in three years has not succeeded in making an exact inventory of its material, is also ignorant of the exact number of its employees in different classes.”

The operation of the Italian State railways has been described as “so defective as to attain the proportions of a public scandal, if not a national disgrace.” It is alleged that instead of the Minister of Railways controlling the railway servants they intimidate him. Australian State railways, the critics declare, are unprofitable and a drain on the State, while the difficulties arising from political pressure have forced the governments to appoint commissioners with very wide powers to manage the railways as would a board of directors. In New Zealand the railways are described as having been constructed and worked for development purposes, and particularly the provision of employment. As to the financial results, it has been stated that for twenty years the Dominion had been losing at the rate of £350,000 per annum. That, of course, is a relatively small sum taking all the circumstances into consideration, but it is significant, from the point of view of the critics, when considered in relation to the fact that the construction of the New Zealand railways was carried out for a sum substantially less than the corresponding figure for this country. If, they argue, it is not possible to show a profit when

Other Criticisms.

cost of construction has been so light, what would be the experience of the United Kingdom in view of the inevitably large cost of acquiring expensively-constructed railways such as ours ?

Another argument of the critics concerns the financial aspect of the acquisition of British railways. The price that would have to be

The Cost of paid, is, of course, purely a matter of conjecture,
Acquiring but obviously the State would have to be a fair
British Railways. buyer, not a confiscator, of private property.

Working on this basis, in the light of the powers possessed, and taking into consideration the nature of the various stocks into which railway capital is divided and the rates of dividend, the *Railway News* calculated in 1913 that for the British railways (English, Welsh, and Scottish, Irish being excluded), the fair price would be £1,759,818,000. The total capital of these railways at 31st Dec., 1912, was £1,289,614,000, so that on this basis State purchase would at once increase the capital invested by no less than £470,000,000 sterling. Taking these figures, the result of a purchase by means of Consols was worked out and appeared in the earlier editions of this book, but, of course, those original calculations are now valueless. Since 1914 the prevailing rate of interest has increased. The Government have had to pay as much as 5 per cent. on money they have borrowed, and even now they certainly could not borrow at less than $3\frac{1}{2}$ per cent. In a matter of this sort it is doubtful if less than 4 per cent. would be accepted, because the average dividend on the nominal capital (all classes) of all the railway undertakings is now over 4 per cent. ; in 1925 it was 4.19 per cent., or practically $4\frac{1}{5}$ per cent. Dealing with the figures on a 4 per cent. basis, however, the result is not very encouraging. The four great groups had a net capitalisation on 31st Dec., 1925, of £1,060,567,033. One meaning of this figure should be explained. It excludes all the nominal additions to capital, although it is doubtful whether shareholders would consent to these being wiped out, nominal though they may be. It includes, on the other hand, all the premiums on the face value of stock which shareholders have paid, and, concerning this, there does not seem to be any possibility of doubt as to whether shareholders would be entitled to count in these premiums. The next point is, would this £1,060,567,033 be accepted as full value. It is difficult to answer hypothetical questions, but in all probability it would not. First of all, it does not seem to represent the full

valuation of the railways. For instance, the London, Midland and Scottish capital on which dividends are paid is in round figures 407 millions, but the capital account also includes $14\frac{1}{2}$ millions balance of premiums received which although not entitled to any dividend, is still part of the capital employed in the business, and is part of the assets belonging to shareholders. Finally, the company's balance sheet values the assets of the undertaking at $20\frac{1}{2}$ millions more than the debenture, share, etc., capital plus premiums. The explanation, of course, is that money out of revenue and reserve funds to that extent has been spent on the undertaking, and presumably has increased its earning power. This also would have to be brought into consideration if the Government were taking over the London, Midland and Scottish. It might be regarded as excessive ; it might be proved, on the other hand, that it is a very conservative valuation of what has been put into the business from these sources. In any case, there it is. The London, Midland and Scottish, therefore, would go into any negotiations with 407 millions, plus $14\frac{1}{2}$ millions, plus $20\frac{1}{2}$ millions, together 442 millions as a rock bottom starting-point. It is a remarkable thing that the other three companies appear to be in a somewhat similar position if the writer properly understands the Ministry of Transport figures. The only variation is the extent of the excess assets over the total amounts of capital liabilities. The point of all this is that the four railways are worth a great deal more than the 1,060 millions given above as their net capital. The next consideration is at what figure it would be possible for the Government to buy out shareholders, etc. It is impossible to say, of course. In 1913 the *Railway News* idea was that the Government would have to pay the shareholders 36 per cent. more than the nominal capital. We will, therefore, work out the transaction on a basis of net capital plus $33\frac{1}{3}$ per cent. for compulsory purchase. This would make the purchase price of the four companies £1,414,089,377, and assuming the purchase were made by means of a 4 per cent. stock, the interest due on the new stock would approximate £56,563,572. This would not help the plans of those people who advocate State ownership with the object of either (1) producing for the State revenue in relief of taxation, (2) enabling rates and fares to be reduced, or (3) facilitating schemes of social betterment, because in the last four years the net income of the whole of the railways (before paying dividends, of course)

has never been more than 53·3 millions, and in 1925 was 44·7 millions. If the Government had already acquired the railways on the basis taken above, the result would have been not merely that in 1925 they would have had no surplus to apply to any of the three objects mentioned, but they would actually have had to take approximately $11\frac{3}{4}$ millions out of the pockets of the taxpayers to make good a deficit on railway working. If it should be objected that the purchase price taken is too high ; that it should not include anything for compulsory purchase, and that it should cover only actual net capital, plus premiums, plus excess of capital assets over capital liabilities, the position would not be effectively better. On this basis the four companies would be able to bring into account not less than £1,122,367,000 as their capital value, and the annual interest on this at 4 per cent. would be £44,894,680. How far net income would go towards providing this sum is seen from the totals for the last four years : 1922, £53,364,862 ; 1923, £51,228,636 ; 1924, £47,178,436 ; 1925, £44,771,081. Obviously the acquisition of the railways by purchase would not yield “ fat ” surplus profits for the State to apply to any social purposes, and there would be a serious danger that in times of bad trade the railways might become a considerable drain on national finance.

Brief reference should be made to the bearing on this subject of State control during the war. The success of the control can

**State Control
during the
War.**

hardly be regarded as an argument in favour of nationalization because, throughout, the Government obtained all the assistance it required without having to purchase the railways. It took control and imposed its requirements and decisions on the companies just as completely and effectively as if it had owned all the systems lock, stock and barrel. It is doubtful if the object in view could have been better attained if we had had State ownership. Why then, it may be asked, acquire the railways if in a time of graver emergency than we had ever known before, the State obtained all it wanted and paid virtually nothing for it ? It is true that in the end the Government had to pay the companies many millions ; but however large the sum it was a relatively insignificant amount to pay for the immense use which the Government had made of the railways, and for which no payment was made during the actual war years. On the other hand, the opponents

of nationalization cannot fairly base an argument on the experience of the general public. Passenger services were curtailed and in some cases altogether withdrawn; ordinary goods and mineral traffic was delayed, and fares and rates were increased so heavily as to become burdensome. None of these things, however, is an argument against nationalization, because every other consideration was subordinated to the one great purpose, and rightly so. In normal times, neither the State nor private enterprise would dare to attempt to impose such restrictions on the public. There is, perhaps, one direction in which the disadvantage of Government control was experienced—in its dealings with labour. Wages were jumped up enormously. The base rate was increased 100 per cent, and on top of this was imposed a "cost of living" bonus. At the time there was a feeling (whether justified or not it is impossible to say) that the political colour of the dominant party in the Government of the time had resulted in too ready or easy a yielding to the demands of railway labour. But can this be fairly said when we remember other things of a similar nature that were happening at that time? Large as was the percentage increase (cost of living, bonus being included) which railway men received, their individual earnings were still below those of men, and often mere youths, who were set to do repetition machine work requiring no more technical skill than could be acquired in a few weeks. The Government may have yielded easily to the pressure put on them and the men may have got more liberal terms than they would have got from the companies themselves, but when the prevailing circumstances of the time are considered, it is really doubtful if the railway officials freed from Government control could have made a much better bargain. The net result of all this is that our experience during the war throws no light whatever on the question of the efficiency or otherwise of State ownership.

It is not necessary to dwell on the arguments that State management is inefficient compared with that of private companies; that the State cannot get as much labour out of its employees as does the private employer; that the economies which are supposed to result from unification of management are gravely illusory, or that Parliament has neither the time for railway business nor a sufficiently defined railway policy to enable it to assume the ownership,

**Inefficiency
of State
Management.**

and direction in large matters, with satisfactory results. The arguments on both sides have been presented as comprehensively as possible, but the subject is one that really demands a book to itself, and it will have been realised how directly conflicting are the opinions of the supporters and the opponents of railway nationalisation. With that the final decision as to which set of arguments is right, or, if neither is completely convincing, which is the more expedient policy, must be left to individual students of the question.

II. CANAL ECONOMICS

CHAPTER XII

CAPITAL REVENUE AND TRAFFIC

IN the first edition of this book this section began with the words—"Canal statistics are scanty and far from satisfactory." This criticism still holds good, and to it has to be added **Unsatisfactory Statistics.** another—that in most respects they are now badly out of date. There is one exception to this statement. Dovetailed into the Ministry of Transport Returns as to capital, traffic, etc., of the railways, there is an unobtrusive little table (which one would not expect to find there, and for that reason might easily miss) giving tonnages of traffic "originating" on the canals in Great Britain. This appears to be a very useful, up-to-date table, to which reference must be made later; but so far as capital, length of canals, their receipts and expenses are concerned, the figures remain as they were in the first edition. Later information on these subjects is not available, and as the figures relate to 21 years ago, the advisability of their retention or exclusion has been a very perplexing question for decision. The passing of years may have made them hopelessly inaccurate. The capital of the canal companies may be more, or less, than it was then; the mileage of canals proper is unlikely to be more; in all probability it is less. On the other hand, the capital of inland waterways may easily be more because, for instance, in the years since the war the City of Nottingham has spent large sums in improving the River Trent. Notwithstanding these defects, however, it seems desirable, perhaps even necessary, to repeat these old figures. For one thing there are no others. Every seeker after information about canals must go to them, inadequate though they may be. And if they are to be reproduced, then the former comments must remain if only as a warning to any who may attempt to use them.

By the Railway and Canal Traffic Act, 1888, the companies are required to make an annual return stating their names, the name of their principal officer, and the place of their office; and giving a

short description of their canals. By the next section of the same Act power is given to the Board of Trade to require returns as to capital, revenue expenditure, profits, etc., "from time to time . . . not being oftener than once a year." The power given is ample enough for all purposes, but apparently it has not been thought worth while to require such returns to be made regularly from year to year, as is the case with railways. Since the Act was passed three returns have been made—in 1888, in 1898, and in 1905, the latter being for the purposes of the Royal Commission on Canals and Waterways. Apparently it had been decided by the Board of Trade that decennial returns were sufficient until the commission was appointed. These returns are unsatisfactory because, taken individually, they are not easily comparable—the last of the three attempts to bring them into line, but even this has its pitfalls for the unwary. For example, in one place the length of the independent canals and navigations in England and Wales (independent in that they are neither owned nor controlled by railway companies) is given as 2,896 miles, of which 2,564 miles are under the control of canal companies and other authorities and 332 miles are without controlling authorities. In another place, however, the length for England and Wales is given as 2,456 miles. The explanation of the discrepancy is that in the first case account has been taken of every canal and waterway existing whether capable, in its then condition, of being put to useful service or otherwise. In the second case, account is taken only of those canals on which a record of traffic is kept and therefore capable of, and actually being put to useful service. The larger distance may be regarded as representing potential waterways, and, of course, it was useful for the Royal Commission to have a complete census of the waterways. For practical and comparative purposes, however, the smaller figure is the only one which has any interest.

For the whole of the United Kingdom the length of canals on which a record of traffic is kept is given as 4,673 miles, which compares with 20,390 miles of railway in Great Britain alone. The latter figure, it will be remembered, does not represent length of running track, which is 37,018 miles, sidings being ignored. The railways of Great Britain, therefore, are more than four times as long as the canals,

**Return
Required by
Parliament.**

**Canal Traffic
Records.**

or if running track is taken, more than seven times as long. These 4,673 miles of canals have a total paid-up capital of £47,550,768 as compared with the railways' £1,177,417,000 in 1925. Per mile of canal the capital amounts to £10,175 ; per mile of railway it is £57,744, or per mile of running track, £31,806. The total revenue of the canals in 1905 was £2,680,710, or £574 per mile. The expenditure was £1,891,213, or £405 per mile, and the profit was £789,497, or £169 per mile. The proportion of expenditure to receipts was 70·5 per cent., while in the case of railways it was 63 per cent. in 1912, and 83·12 per cent. in 1925. The profit earned was thus equal to 29·5 per cent. of the income compared with the 37 per cent. and 16·88 per cent. earned by railways in 1912 and 1925. From the point of view of the capital employed, however, the financial return is an extremely poor one. The gross revenue does not amount to more than 5·6 per cent. of the capital while the net revenue is only 1·6 per cent., compared with 3·12 per cent. for the railways. The income is derived from three sources—from tolls £1,319,204 ; from freight as carriers, £828,302 ; and from " other sources," £533,204. The proportions of these to the whole are respectively 49·2 per cent., 30·9 per cent., and 19·9 per cent. It is apparent, therefore, that to a very large extent the canal companies are toll-takers rather than carriers. They provide and maintain the waterways and charge for the use of them ; and there, in many cases, their activity ceases. The actual work of transporting merchandise is left to canal carriers. The gross expenditure is also divided under three headings—management and maintenance, £800,251 ; transit expenses, £661,089 ; " other expenditure," £429,873 ; and the proportions of these to the total expenditure are respectively 42·3 per cent., 34·9 per cent., and 22·7 per cent. On their work as carriers the companies appear to have made a fairly good gross profit in those days. The receipts from this source, as has been seen, amounted to £828,302, and presumably " transit expenses," £661,089, represented the cost of doing this work. If that is so there was a gross profit of £167,213, which is equal to 25·29 per cent. of the receipts.

The tonnage figures given in the 1905 returns were even more unsatisfactory than those of mileage, etc., and as the Ministry of Transport now publish returns, which, no doubt, are accurate and entirely to be relied upon, those originally given here might be

omitted as being no longer essential to a proper understanding of the subject. But, again after very careful consideration, it has been decided to retain them, and the comments made on them. They are still the existing figures for the years to which they relate, and must be referred to when research is being made into canal history. That being so, it seems very desirable to point out their pitfalls in the hope that these criticisms will help future investigators and publicists who may have to deal with them.

In the 1905 return there was a summary table from which the quantity of merchandise and minerals carried was abstracted as follows—

							<i>Tons.</i>
1888	.	.	.	.	.	.	36,461,682
1898	.	.	.	.	.	.	41,600,706
1905	.	.	.	.	.	.	43,161,926

On the face of them such figures certainly appeared surprising. They suggested that the water-borne traffic of the country was quietly but steadily expanding from year to year ; and this is altogether opposed to one's preconceived notions, even though they may be based on quite a superficial knowledge of the subject. For example, it is common, whenever canal traffic is mentioned in public, to allude to the inefficiency and constant decline of our waterways, rather than their quietly increasing usefulness. It is a serious, and stupid, defect of the summary table that it makes no attempt even to warn investigators that the figures are not to be relied upon. The explanation is only to be found later by means of patient search through the detailed table dealing with the tonnage passing over each canal or waterway. Examination of this table reveals instance after instance in which it is stated: "No return for 1888," while from the same waterway there are returns sometimes for 1905 only, sometimes for that year and for 1898 as well. The principal cause of the growth, however, is to be found in the particulars concerning the Manchester Ship Canal. That canal was not completed until 1893. Naturally it could not make any return for 1888. In 1905 the traffic on this important waterway totalled 5,999,400 tons. Here, then, is the explanation of a variation of, roundly, 6,000,000 tons. Again the Gloucester and Berkeley Ship Canal is marked "No return for 1888," whereas in

1905 1,053,724 tons passed over it. Together these two ship canals account for well over 7,000,000 tons, which is more than the difference between 1888 and 1905. Of course they are parts, and very important parts, of the national system of waterways, but when their influence on the returns is exactly ascertained, the results seem to bear out the general impression that on the whole the inland waterways of the United Kingdom are retrogressive rather than progressive.

Another point has been made concerning the accuracy of the tonnage returns. The traffic carried is analysed under four headings — (1) loaded and discharged on the canal ; (2) loaded but not discharged on the canal ; (3) discharged but not loaded on the canal ; (4) not loaded or discharged on the canal. Heading number one, of course, relates to purely local traffic confined entirely to the canal on which it originates, and there should be no question as to the accuracy of that total which is stated at a little over 14,500,000 tons for England and Wales. Heading 2 relates to traffic originating on a particular canal and passing on to another or others ; heading 3 deals with traffic originating elsewhere and concluding its journey on the canal which makes the return ; heading 4 gives entirely through traffic which neither begins nor ends its journey on the canal which makes the return but merely passes along it on the way to its destination. In these headings, it has been suggested, there is much duplication of the quantity. For example, take a consignment of 100 tons of goods passing over three canals. Canal A counts 100 tons as loaded but not discharged ; Canal B, the intermediate canal, counts 100 tons of traffic not loaded or discharged ; and Canal C counts 100 tons not loaded but discharged. In this way the original 100 tons can come into the reckoning three times and can become 300 tons in the final total. This, however, is not the full extent of the possible error which increases with the number of canals over which the traffic passes. A boat might be loaded in the South Staffordshire Black Country and pass on to London by the following canals : Birmingham Canal Navigations, Warwick and Birmingham Canal, Warwick and Napton Canal, Oxford Canal, Grand Junction Canal and Regent's Canal. There are here six separate canals, and, if the criticism offered has any foundation in fact, then the consignment from the Black Country would appear

in the returns no fewer than six times. Of course, all the canals mentioned have passed this particular consignment along and all have derived some revenue from it. Each is legitimately entitled to say that its waterway has been used by boats carrying a certain tonnage of goods or minerals ; but when all the totals are brought together in a summary, 600 tons, say, of traffic really relates to the movement of but one consignment of 100 tons. Faced with such a difficulty the returns may not unnaturally be regarded with suspicion and used with great hesitation when the point under consideration is the part which the canals play in transporting the products and manufactures of the United Kingdom. The totals of traffic loaded and discharged, and loaded but not discharged would probably come nearest to giving us an idea of the real volume of traffic on the canals, but unfortunately it is not possible from the returns to get out such a figure for the whole of the United Kingdom. It can be done for England and Wales for the year 1905. The total traffic for these divisions of the Kingdom returned from all sources was 41,178,172 tons. Of this 23,454,557 tons come under the headings "loaded and discharged," or "loaded but not discharged," which leaves a total of 17,723,615 tons which either was discharged but not loaded, or neither loaded nor discharged on the particular canals making the returns. Presumably the 17,723,615 tons was through traffic which had already been counted under the other two headings, and of the original 41,178,172 tons the duplication thus made is equal to 43 per cent. Assuming, however, that the 43,000,000 tons given in the return is correct for 1905, it makes a poor comparison with the 461,000,000 tons returned for the railways of the United Kingdom for the same year—1905. The railway traffic was more than ten times as great.

The defects of the figures given in the volume of returns (Vol. IV of the publications of the Royal Commission) are recognised in the final report, where a new table appears, including only those waterways in regard to which full statistics of traffic have been returned for each of the three years : 1888, 1898 and 1905. This re-arrangement deals with only 3,148 miles of waterways for the United Kingdom divided up as follows : England and Wales, 2,416 miles ; Scotland, 153 miles ; Ireland, 579 miles. The result, of course, is all right if the object in view is to secure safe comparisons, but still the elimination of the

**Re-arrangement
of Returns.**

tonnages of the companies that have not made returns for each of the three years means that the figures cannot be taken as the measure of the work done by the canals as a whole. It will be remembered that in one or two cases there are returns for 1905, but not for earlier years, and in those cases, of course, the 1905 figures must be omitted, and so the total tonnage for the year is reduced. With this explanation the totals for the United Kingdom may be set out as follows, the seaborne traffic on the Manchester Ship Canal being excluded from the tonnage—

Year.	Total Tonnage conveyed.	Total gross Revenue.	Total Expenditure.	% of Expenditure to gross Revenue.	Total net Revenue.
1888	35,301,857	1,978,834	1,277,740	64·6	701,094
1898	36,011,241	2,033,222	1,498,053	73·6	535,169
1905	34,136,767	2,081,552	1,571,260	75·5	510,292

There is no hint of an explanation as to why the traffic increased 709,384 tons, or 2·008 per cent., in 1898 compared with that for ten years earlier, nor of any reasons for the subsequent decline of 1,874,474 tons, or 5·2 per cent. between 1898 and 1905. But the table brings out more clearly the general fact not shown in the returns proper (Vol. IV) that water-borne traffic has declined within the last generation. Comparing 1905 with 1888 there is a fall of 1,165,090 tons, or 3·3 per cent.

Gross revenue in the same period has been quietly progressive. From 1888 to 1898 there was an increase of £54,388, or 2·7 per cent. ; from 1888 to 1905 it was £102,718, or 5·15 per cent.

**Increase of
Gross Revenue.**

The explanation advanced for this is the large increase of revenue on two or three waterways, such as the Aire and Calder and Leeds and Liverpool canals, which counterbalances the decreases on many others. The Aire and Calder is one of the few inland waterways which have been developed on modern lines and have consequently improved their position. The average receipt per ton for the three periods was : 1888, 1s. 1·45d. ; 1898, 1s. 1·55d. (= + 0·1d. compared with 1888) ; 1905, 1s. 2·63d. (= + 1·08d. compared with 1898 and + 1·18d. compared with 1888).

But while gross revenue has increased, the total expenditure has

grown at an even faster rate, with the natural result that net revenue has also declined.

" This decrease (says the report) would have been still more serious had not the collective gross revenue of the companies derived from sources other than freights earned as carriers, or tolls, risen from £281,638 in 1888, to £404,855 in 1905. Most of this increase is derived from the increase in rents of property belonging to the companies, but some of it from the supply of water, crannage, haulage, etc."

One other small, but interesting, point is worth brief attention. When the details of traffic for 1905 are examined it is surprising to

find that the largest tonnage given for any single canal company is the 7,500,000 tons of the Birmingham Canal Navigations. The Manchester Ship Canal in the same year did not reach 6,000,000 tons, and no other canal reaches 3,000,000 tons. Some of the more important totals are : Aire and Calder, 2,800,000 ; Leeds and Liverpool, 2,400,000 ; Bridgewater, 2,100,000 ; Grand Junction, 1,790,000 ; the Thames (between London Bridge and Cricklade), 1,390,000 ; Trent and Mersey navigation, 1,317,000 ; the Weaver navigation, 1,076,000 ; Gloucester and Berkeley Ship Canal, 1,053,000 ; and Regent's Canal, 1,045,000.

Having exposed the weakness of the old figures (possibly at too great length seeing that they now have no more than an antiquarian interest) we may turn with greater confidence to

the latest returns issued by the Ministry of Transport. As a preliminary regret may be expressed that they do not cover more than the tonnage carried. It has been twenty-one years since we had any authoritative figures giving important information as to the canals—their capital, earnings, expenses, and profits for instance. It is time the information under these headings was brought up to date. Much may have happened in this long interval. However, it is satisfactory to have reliable figures as to tonnage. For the full details of the table given on the next page, reference must be made to the Appendix. Here the totals only can be given.

The first thing to which attention should be called is that the return relates only to traffic " originating " on the canals of England and Wales and Scotland.² In other words, it is only the traffic which is loaded and begins its journey on the particular canals which make the returns. Consequently, the table eliminates those duplications to

which attention has been called earlier in the chapter. It contains no traffic which in the words of the old returns was "neither loaded nor discharged," nor "not loaded but discharged." Of course, from the point of view of the individual companies the tonnages which would be included under these headings are important, because without them the total volume of work done by the canals

TRAFFIC ORIGINATING ON CANALS IN GREAT BRITAIN¹

	1921	1922	1923	1924	1925
	tons	tons	tons	tons	tons
Railway owned .	1,708,547	1,885,830	2,058,944	2,183,933	2,030,675
Other than railway owned .	10,175,948	12,708,547	13,804,929	14,272,046	13,540,266
Totals	11,884,495	14,594,377	15,863,873	16,455,979	15,570,941

¹ Excluding Manchester Ship Canal.

would not be fully represented. So many tons may have passed along a particular canal and contributed to its revenues. But when we are attempting to ascertain the extent to which the canals as a whole are used, the only figures which matter are those given above.

Two things are striking. One is the comparison of these figures with that which was attempted to be got out of the 1905 returns. Taking then the old headings of "loaded and discharged" (on the same canal) and "loaded but not discharged" (on the same canal), we got a figure of 23,454,557 tons for England and Wales alone. In the light of these present-day figures one rather wonders what has happened. Was the computation of 23½ million tons for 1905 still inaccurate owing to duplication, or has the use of the canals actually fallen off to the extent which on the surface the later figures suggest? It is impossible to answer the question because of the defects of the earlier returns, and it is regrettable that it should be so because when it is remembered that the later figures include Scotland and the earlier one does not, the falling off is considerable. Taking the best of the recent years tabulated above and comparing it with the 1905, the decline is 29·8 per cent. If this is so the canals have lost nearly one-third of the traffic they had twenty-one years ago. It is very regrettable that the defects of the 1905 returns make such a comparison unsafe.

When we come to the later years we are on safer ground. These

figures at any rate are comparable, and they are extremely interesting. One of their features is the steadiness of the totals from year to year. In this comparison 1921 ought really to be excluded, because in that year there was a strike of coal miners lasting about three months, and if the Appendix is referred to it will be seen that there was a considerable decline in the tonnage of coal carried that year. For the remaining years the variations are comparatively small. Another remarkable thing is the relatively small share of the water-borne traffic of the country for which the railway owned canals of the country are responsible. Finally, it may be suggested that the details given in the Appendix should be examined. The division of the tonnage over the different kinds of traffic, particularly the extent to which coal bulks in the return, is interesting.

The statistics as a whole show quite clearly that however potentially important our canals and waterways may be, at present they are a comparatively neglected and insignificant means of transport. The historical reasons for this have already been seen ; in the succeeding chapter other reasons for their present position will be given.

Not much time need be spent in outlining the basis of canal tolls and charges, because it is very similar to that explained in the chapters dealing with railways ; indeed, it will be remembered that the original railway schedules were based on those of the canals which were already in existence. From the extremely simple examples that have been given in earlier chapters, however, there has been, as in the case of the railways, great development, and for many years the canal companies have worked to classifications that are just as detailed as those of the railways ; in fact, in some cases the railway classification has been used with just a few variations to meet special circumstances. The numbering of the classes (A, B, C, 1, 2, 3, 4, 5) has also been just the same. What is to happen in the future, however, is not yet settled. The whole question of canal classification and rates has to be dealt with by the Railway Rates Advisory Committee when the task of fixing railway rates is finished. It may be that the committee will fix on the canals the elaborate new classification which has been created for, but is not yet in use by, the railway companies ; possibly a simpler one may be devised for them ; and there may be variations upwards or downwards of the

Decline of Canals.

Rates and Tolls.

rates the companies are permitted to charge. For the present, however, they are still working to their old classification and to their schedule of charges, plus the permitted increases, which are the outcome of the war and post-war periods.

The schedule of maximum rates and charges of the Shropshire Union Railways and Canal Company is reproduced in the Appendix. This, it will be seen, in general outline, is in all respects similar to a railway schedule of charges and is framed with the specific intention of charging "what the traffic will bear." One point of difference will be noticed and that is that the rates "taper" more rapidly than do the railway rates, *i.e.*, the distances for which the specified rates per ton per mile apply are smaller, the lowest rate being reached after a journey of only 30 miles as compared with 100 miles in the case of the railways. It will be seen also that the canals are entitled to charge station and service terminals in just the same way as the railway companies. Few of the canals, however, are carriers, being merely toll-takers. In these cases tolls are scheduled in the same manner, but in the majority of cases there is an important difference from the schedules of charges for conveyance. The tolls are not graded so fully. As a rule, the numerical classes are grouped together and one rate of toll applies to all of them. The schedule of the Birmingham Canal Navigations Company, an exclusively toll-taking concern, is reproduced in the Appendix. It will be seen that in this case the variation mentioned is not the only one. First of all, class A is divided for the purpose of giving a specially low rate for things of small value such as basic slag, unground gas lime, refuse and rubbish for tips. These things are in class A, division I. Having made this departure from what has become familiar in the case of the railway schedule, the remaining articles in class A and class B are lumped together. Timber is removed from class C and put into a special class by itself. Finally, the ordinary variations end with the grouping of the numerical classes to which reference has been made, the gradation thus being less than that of the railways. There is, however, one abnormal variation. There is what is called scale 2 which, under the circumstances specified, removes certain articles of low value, such as cannel, tap, mill, forge, and coal cinders, from the ordinary classes and imposes a special rate. Tap, mill, and forge cinders are by-products of ironworks, of the process

of refining pig-iron and converting it into bars, sheets, or angles, and they have some value because in addition to the slag and other refuse of which they consist, they contain a recoverable quantity of iron. It should be added that the company do not invariably charge their maximum tolls as scheduled ; indeed, there are many reductions in actual working.

Happily there are no questions of differential or preferential rates for foreign produce to discuss in connection with the canals,

**No Differential
or Preferential
Rates.**

for which, possibly, the comparatively insignificant part which they take in the transport work of the country is responsible. The only complaint ever made concerning them is that for through traffic some of the companies insist on maintaining the maximum toll charge and decline to grant concessions. For example, if a consignment has travelled 30 miles on one canal, and, if continuing its journey on the same waterway, would be entitled to the lowest scale toll for the remainder, it passes immediately on to a second canal, the second canal company takes no account of the previous journey and charges the scale toll applicable for the length of journey on its waterway just as if the traffic originated with it. That is one of the defects arising from the multiplicity of canal companies owning comparatively short lengths of waterway.

CHAPTER XIII

DEFECTS OF THE CANAL SYSTEM

WE come now to a much more interesting subject—the consideration of the defects of the national waterways, the causes of those defects, and the possibilities of the future. It is a subject which arouses keen controversy, the partisans of water and land transport being as diametrically opposed as are those who take sides over certain questions of railway policy. On one point, however, all are agreed—that with one or two exceptions (where the owners of the waterways have had faith in their undertakings and enterprise enough to modernise them and to conduct their business on sound commercial lines) our waterways are in a neglected, defective condition, taking but an insignificant part in the transport industry. Their general condition may be summed up in a sentence taken from the report of the last Royal Commission appointed to investigate the question and suggest remedies: “With a few exceptions waterways stand as they stood in the middle of the nineteenth century.” This sentence is a sufficient condemnation of the system. The industries and commerce of the country have grown enormously since the middle of the last century. To give but one instance, the output of coal has grown from 64,000,000 tons in 1854 to 267,000,000 tons in 1924. Foreign trade alone (imports and exports combined) has grown from £268,000,000 to £2,078,000,000 since then, and it is a recognised economic fact that the home trade is always immensely greater than the foreign. In the same period the population of Great Britain has doubled. All this, of course, means a vast increase in the transport work arising out of the industries and requirements of the population. How great has been this increase may be assumed from a comparison of some railway figures for England and Wales alone for the year 1854 and 1925—Miles open, 1854, 6,114; 1925, 20,390; Capital, 1854, £240,235,000; 1925, £1,177,417,650; passengers carried, 1854 (including season-ticket holders), 92,346,000; 1925 (exclusive of season-ticket holders), 1,232,580,914; total traffic receipts, 1854, £17,324,000; 1925, £199,652,875. Concurrently with this enormous expansion inland waterway transport has been

retrogressive. With one or two conspicuous exceptions the physical condition of the waterways is generally inferior to what it was half a century ago, and the traffic which passes over them has diminished in volume. Were it not for the tonnage attributable to such new waterways as the Manchester Ship Canal, and to improved waterways such as that belonging to the Aire and Calder Navigations Company, the traffic of the canals would show an enormous decrease in even less a period than half a century.

Why is it that a means of transport, which, at its introduction, conferred an immense benefit on the land by reducing the cost of, and generally facilitating, transport has fallen thus

**Causes of Decline
of Canal System.**

into desuetude? The primary reason seems to have been the lack of faith in the future of their undertakings shown by the canal proprietors at the time of the introduction of railways. These people, who, hitherto, had enjoyed a virtual monopoly of the most easy means of inland transport then existing, and who had grown rich on the profits of their enterprise seem, in the main, to have been panic-stricken by the mere idea of railway competition. We hear much nowadays of the superiority of water transport over land transport for a large range of industrial products and raw materials. Whether it is so or not appears to depend largely on circumstances, or even, perhaps, the point of view of people interested on one side or the other. As to which view is accurate it will be possible to form a more definite opinion later. But at the outset many of the canal companies seemed to have no doubts on the subject. To them the day of canal usefulness was ended and their chief business appeared to be to get rid of their canals as quickly as possible. Hurriedly they parted with them to the newly-created railway companies. No thought seemed to have been entertained that it was desirable or possible to put their waterways into a condition to resist the new form of competition.

The railway ownership of canals which thus resulted is frequently advanced as one of the reasons why water transport has declined.

**Railway
Ownership of
Canals.**

and with some justification. But while this is so, there has been much injustice done to the railways in this connection. It is a long time since they acquired the canals, and the present generation of business men, knowing only that about one-third of the canal mileage of the United Kingdom is either owned or controlled by

railway companies, but knowing nothing of the historical reasons why this ownership came about, have been free in their denunciations of the railway companies for having acquired canals in order that they might "strangle" competition. It is an admitted fact that in the main the railway companies acquired canals because they were forced to do so. The canal proprietors of those early days of the nineteenth century, anticipating the ruin of their business with the advent of railways, raised parliamentary opposition to the bills promoted to empower the construction of railways. Sometimes they went so far as themselves to promote bills seeking authority to convert their canals into railways. The price of the withdrawal of their opposition was the purchase of their undertakings. In this way the railways became absolute owners of 965 miles of canals in England and Wales, whereas the length of independent canals and navigations of the same division of the United Kingdom on which a record of traffic is kept is given as 2,456 miles. In addition they control another 218 miles. In justice to the railway companies it should also be mentioned that while they have taken no steps to improve or develop their canals they have maintained them efficiently. It is admitted by the Royal Commission that on the whole their canals have been kept in a good state of repair; far better than some of the independent canals. Sometimes this has entailed heavy expenditure. The Birmingham Canal Navigations afford an instance of this. These canals run through mining districts where there have been subsidences of land. It is stated that in one case where the canal originally ran through a cutting it is now carried on an embankment because of the subsidence of the surrounding land due to mining operations. Nothing but the long purse of the London and North Western Railway Company, stated one witness before the Royal Commission, has saved this canal from destruction and kept it in a condition which enables it to pass an average of about 7,500,000 tons of traffic per annum. And 7,500,000 tons, even though it is mainly local traffic, is some answer, though not a complete one, to the allegation that the railways have "strangled" the canals.

While so much is admitted in justice to the railways, it remains a fact that their ownership of canals has not been altogether beneficial. They may have saved these canals from becoming derelict; they may have made them available for local traffic (the London

and North Western Company use the Birmingham canals largely as feeders for their own and other systems), but at the same time their ownership or control has impeded the use of the canals for through, or long-distance, traffic. It is asserted that while they have been quite willing to use the canals, and to allow them to be used for local purposes, they have taken good care to hurry the through traffic off them on to their own systems. If waterways are to be used for through traffic it is essential that through rates should be arranged for the whole journey. Through traffic is discouraged, if not made impossible, if all the canal companies insist on charging their scale tolls. On this point there are some instructive paragraphs in the final report of the Royal Commission, which seem worth while quoting at considerable length—

**Has Railway
Ownership been
Beneficial?**

“The allegation that railway companies owning canals discourage through traffic over their own and other canals by refusing to give a reduction on through tolls was chiefly made in connection with the Birmingham canal system. Under the Act of 1846 . . . the London and North Western Railway Co. have a supreme voice in fixing the tolls on this system. . . .

“About the year 1875 the Warwick, Grand Junction, and other canal companies interested in the through trade from Birmingham to London, approached the Birmingham Canal Company with a view to arranging through tolls, which did not then exist at all. The Birmingham Canal Company declined to accede, and in 1877 the matter was taken before the Railway Commission, who ordered a through toll. This order was, on the motion of the Birmingham Canal Co., set aside or reversed by the Courts. An arrangement, however, due, it is stated, to the influence of the Board of Trade, was made in 1884 for through tolls; but the Birmingham Company insisted upon higher tolls per ton per mile for 14 miles than those given by the other companies concerned, except the Oxford Canal, of which only $5\frac{1}{2}$ miles are traversed in the through route. Under this agreement, which is stated to have arrested a previous steady decline of the through trade, meetings of representatives of the companies interested have been held from time to time to consider proposed modifications of through tolls.

“A number of instances were furnished to the Commission, in which while other companies were anxious to reduce, and in fact did reduce, their shares in the through tolls, the Birmingham Canal Company refused to do so. Mr. Impey, representing the South Staffordshire Freighters' Association, produced figures showing that while, on a number of important articles, the other companies made considerable reductions of tolls, the Birmingham Canal Company maintained their original toll on the level of the 1884 agreement. He summed up the matter by saying: ‘After a great many years’ negotiations certain through tolls were agreed to

**Reductions
Declined.**

by the Birmingham Canal Company on certain traffic and by certain specified routes, but it only applies to portions of the traffic passing over or arising on their system, and they still take the large proportion of the through rates fixed in 1884, notwithstanding that very large reductions have been made in the tolls by other parties to the agreement.'

"He gave as an instance the tolls on iron. The other parties to the agreement have so far reduced their share of the through rate on iron that they are now getting the equivalent of 0.21d. per ton per mile, while the Birmingham Company, maintaining the original toll rate of 1884, are getting 0.5d. per ton per mile. Mr. Gordon Thomas estimates that the rate for low-class traffic charged on the Birmingham Canal was 300 per cent. per mile higher than that charged on the Grand Junction Canal.

"The London agreement of 1884 was followed by numerous other agreements for through tolls from Birmingham to other parts of the kingdom, and these tolls are the subject of similar complaints. . . . Some of the statements made on this question and the figures given were challenged by Mr. Jebb on behalf of the Birmingham Canal Company, who stated that the refusals of reductions in tolls had not exceeded 10 per cent. of the applications. It is fair to quote on the same side Mr. H. Waddy, the general manager of the Sharpness New Docks and Gloucester and Birmingham Navigation Company, who said he had never found any difficulty 'in getting tolls' from the Birmingham Canal Company, and that 'obstacles are not put in the way of traffic.'

"The representatives before the Commission of the Birmingham Canal Company did not deny the higher charges made in respect of through traffic over their section of the water routes, though they did deny the motive or intention of diverting trade to the railways imputed to them. It was explained that the reasons for a higher toll per mile were that the Birmingham Canal is specially costly to maintain owing to the large expenses incurred for the water supply of a canal at an exceptional height above sea-level, and to the subsidences caused in certain parts by coal workings; while the distances travelled on this canal are comparatively short. It was agreed that it is fair that reductions should be made over the longer and less costly portions of a through route rather than over the shorter and more costly parts. It was also alleged that the present traffic is much congested and that no substantial additional traffic could be accommodated."

The Royal Commission, in the passages quoted, have dealt with the question of through tolls most impartially, and there does not appear to be justification for the unrestricted denunciation usually indulged in. But at the same time it has to be confessed that railway ownership of canals is not the sort of thing to encourage through traffic. Railway companies are organised for land transport. In their opinion canals are as much out of date as pack-horses became when canals were introduced, and they see no advantages to be gained by

The Railway Attitude.

organising water transport for through traffic. Rather there is something to be lost because of the duplication of facilities, some of which, from their point of view, are altogether unnecessary.

Railway ownership of canals is not beneficial from other points of view ; it diminishes competition. It will be remembered that in the case of railways Parliament originally relied more on the influence of competition than restrictive or regulative legislation to keep in check any mono-

**Railway
Ownership and
Competition.**

polistic tendencies that might otherwise have developed. In the same way the retention of the competition of water transport was regarded as desirable. To this end it gave, in 1845, power to the canal companies to become carriers of goods on their canals as well as toll-takers, and also to make arrangements for this purpose with other canal companies, even to lease their undertakings to other companies. Very little advantage was taken of either of these powers though the companies substantially reduced their tolls—to the extent of six-sevenths in some cases, the report says. And yet, such was the fatuity of the legislature, no fewer than seventeen canals were allowed to be absorbed by the railway companies in one year alone—1846. Ultimately action was taken (but not until 1873) to prohibit agreements which would give railway companies the right to interfere with the traffic, rates, or tolls of canals, but it was not until 1888 that Parliament prohibited, under heavy penalties, the application of railway companies' funds for the acquisition of an interest in a canal without statutory authority. The mischief had been done by that date, however, and though there are now no amalgamations of canals and railways, yet the possession by the latter of the canals already acquired is an effectual bar to the extensive and useful canal amalgamations such as we are told are virtually necessary if water transport is to be of any considerable use in the future.

There were amalgamations of canals in the pre-railway days and within a short period of their establishment. The Birmingham Canal system as it now exists is an amalgamation of the canals of four companies, the last of which was taken in in 1846. The Shropshire Union system is

**Amalgamation
of Canals.**

also an amalgamation of the routes of four separate companies. Later, in 1874, the Sharpness New Docks and Gloucester and Birmingham Navigation Company purchased the Worcester and

Birmingham Canal. But the restraining influence of railway ownership and control appears to have been felt even before this. Mr. Gordon Thomas told the Royal Commission that—

“ previously to the control or acquisition of the Birmingham and other canals by the railway companies the Grand Junction Canal Company had large schemes for amalgamation with other canal companies, but they were unable to carry them into effect.”

The position occupied by the railway companies, however, is not the only difficulty in the way of through rates. Multiplicity of

**Defects of
Divided
Ownership.**

ownership and the indifference of canal companies themselves seem to be just as serious disadvantages. As long ago as 1888 Parliament gave the canal companies power to establish a Clearing House similar to that which has proved not merely useful, but indispensable, in the case of the railways. The sole object, of course, was to facilitate through traffic on the canals by affording the means whereby the claims of the different companies might be adjusted. But the canal companies have never taken advantage of their powers. Each acts for itself, and very often, apparently, without any consideration for the needs of through traffic. There was abundance of evidence before the Commission that “ to send a small cargo over no great length of miles they have to negotiate with three or four companies or authorities separately,” or failing this the money for the payment of tolls has to be entrusted to bargemen who work the traffic. Another witness spoke of the extraordinary amount of clerical work entailed in sending a small cargo on a not very long journey by canals. It is astounding in view of this evidence to find that under the Railway and Canal Traffic Act of 1873—

“ A canal or railway company can fix a through rate to any place, give notice to the other companies whose waterways or railways are included in the journey, and if they take objection can refer the matter to the Railway Commissioners, who have power to decide the matter. . . . The Railway and Canal Traffic Act, 1888, extended to traders as against all railway and canal companies the right to apply for through rates and facilities over their lines, subject to the provision that no application shall be made to the Railway Commissioners by the person interested until he has first made a complaint to the Board of Trade and that Board has endeavoured to settle amicably the differences between the complainant and the company.”

It is an admitted fact, of course, that resort to the court of the Railway and Canal Commissioners is an expensive matter, but still supineness of the canal companies in a matter affecting their

interests so vitally seems beyond the bounds of comprehension. Their condemnation is admirably summed up in one paragraph of the report—

“ This entire want of co-operation or organisation is, no doubt, largely due to the fact that most of these companies or authorities are merely toll-takers, and have no other interest in the carrying trade. If, as in the case of the railways, the owners of the waterways also owned the means of transport, and controlled the whole traffic over sufficiently long routes, it is hardly open to question that a far more efficient organisation for through traffic would have everywhere come into existence. In the days when canal companies enjoyed almost a monopoly of large classes of traffic they were able to secure a good revenue merely by taking the high tolls which they then took advantage of their position to impose. It is vain to imagine now, when, so far from having a monopoly, they are at very serious disadvantages in competition with the immense and far-reaching organisation of railways, directed by the skill of highly-trained and well-paid officials, they can live by the same simple system. Yet most of them have made no attempt to organise or promote through traffic. They are content to take tolls on any traffic which may happen to pass over their unimproved and often deteriorating waterways. The difference is that the traffic is in many cases smaller and that to keep any of it the tolls have to be much lower than in the days when canals had to contend with no competition superior to that of horse traction or roads.”

It is the fashion to condemn railways as responsible for the neglected, unused condition of our inland waterways, and some of

the condemnation they have earned ; but it is refreshing to find the Royal Commission speaking out so plainly in condemnation of the canal companies themselves. It cannot be too tenaciously remembered that to a large extent their own apathy is also responsible. Then, perhaps, we may get a proper perspective view of present conditions and their causes.

Primitive commercial organisation, or no organisation at all, divided ownership, and railway control, however, are not the only

defects from which our inland waterways suffer. Their physical defects are just as formidable. As far as the navigable rivers are concerned the chief

defects appear to be the lack of means for the regulation of their flow, and, in some cases, for keeping a clear, well-dredged channel. Lack of regulation of the flow means floods in winter and insufficiency of water in dry weather. Both these defects are capable of being sufficiently controlled if not entirely removed by modern scientific systems of weir construction. As it is, however, our navigable

**Who is
Responsible for
Neglect of Canals ?**

**Physical
Defects.**

rivers, which were the chief highways of commerce in the pre-canal days, are put to comparatively little use in many cases. The Severn to Worcester is described in the Commission's report as one of the best English waterways. In the first half of the eighteenth century and earlier it was the chief highway for traffic from the Midlands, and even up as far as Lancashire, to Bristol, then the second port of the kingdom. Large sums have since been spent on it to make it navigable ; but still the traffic declines. A day spent in travelling by boat from Worcester to Gloucester was chiefly remarkable because of the insignificant volume of up traffic met with on the journey, and the up or import traffic is that which most uses the river. Similar stories of neglected possibilities would be revealed if the other navigable rivers were dealt with in detail. There is a fair volume of traffic in their estuaries, as a rule, but it soon finds the railways and moves inland on them rather than on the rivers and canals.

The defects of the canals are of a different kind. Sometimes water supply is not good ; in winter they may become ice-bound and blocked to traffic ; but in the main their use is hindered by variety of dimensions. One of the principal controlling elements in the use of a canal is the size of the locks. As the weakest link governs the strength of a chain so, as a rule, the smallest lock governs the size of the boat that can use the canal ; but sometimes a canal has been allowed to become so shallow that a boat which could pass the smallest lock could not pass along the channel. Having in view the origin of the canals, their promotion by comparatively small companies in comparatively small sections, and the continuance of this small proprietorship, it is not surprising to find that there is considerable variation in the size of the locks on the canals of the different companies. But it is surprising to find that "the dimensions of locks vary even on the same waterway, often without any apparent reason, those near the ends of the way, or in places where there is considerable local traffic, being sometimes larger than the rest." Variations such as these are obviously a great disadvantage where through traffic is concerned. The boat and its load must be such as will pass the smallest lock or the shallowest water, no matter how large the canal may be in other places. To the carrier on a small, narrow canal these difficulties would be of no effect physically.

Variety of Dimensions.

His boats built for the conditions under which they are generally used would pass almost anywhere.

Commercially, however, there is a great disadvantage in the small boat for moving large volumes of traffic. The dimensions of a boat and the load it can carry can be largely increased (in the case of a boat adapted to a small narrow canal, at least quadrupled) without any appreciable increase in the cost of labour except that required for loading and unloading. The labour required to navigate a boat carrying 100 tons would be very little more than that required for a boat carrying from 25 to 30 tons, nor would the cost of haulage be increased in anything like the same proportion as the load. Such, at any rate, is the inference to be drawn from a work on British canals by the late J. E. Palmer, for many years a director of the Grand Canal Company of Ireland. But if the carrier with small boats can send them anywhere, the carrier who usually works on large canals or rivers with large boats is pretty well confined to his own customary area. It is no use his contemplating sending through traffic off his usual waterway on to those of other companies unless he first assures himself that the boats can pass the locks ; and if the journey is a fairly long one, covering the waterways of three or four companies, it would be pretty certain that they would not.

The Royal Commission took waterways with locks over 14 ft. wide as the standard and called them "barge canals," and those with locks under 14 ft. wide were called "narrow canals." It was found that of the artificial canals 1,165 miles were narrow and 762 miles barge canals, while of the navigations 478 miles were narrow and 834 miles barge. It will be seen, therefore, that apart from the difficulties arising from lack of uniformity in the size of locks, by far the greater proportion of the mileage of inland waterways is not of a sufficient size to permit the most economical handling of through traffic by making it up into large loads.

Another defect arising from limited size and defective construction is the impossibility of using improved methods of traction, chiefly mechanical methods. Narrow, shallow canals with banks unprotected by brick-work or other retaining contrivance cannot be used for barges driven by steam. The wash from the propellers would

Disadvantage of Small Boats.

Barge and Narrow Canals.

Difficulty of Using Modern Methods of Traction.

destroy the banks, for one thing. And if the traction were by means of electrically-driven locomotives running along the towing paths, possibly the same difficulty would arise. In any case, however, even supposing there were none of these physical difficulties in the way of mechanical traction, it is a question whether the use of steam or electricity for the narrow small boats, which alone are now possible, would be remunerative because of the limited load which could be carried. For mechanical traction to be used to best advantage the capacity of the boats would have to be largely increased.

Other defects arise from the physical characteristics of England. The canals which cross between east and west have to surmount what is often called the "backbone of England," their summit levels running up to about 650 ft. above sea-level. The ascents to and descents from these levels mean flights of locks, which are not only a hindrance to the free movement and speed of traffic, but also are expensive to maintain and work. The water required for the summit levels has to be pumped up from the lower levels to which it gravitates as the locks are used.

This is how the position is summed up in the Report of the Royal Commission—

Review of Position. "The foregoing review of the actual material condition of the English waterways at present shows the impediments thrown in the way of through, or long-distance, traffic by differences in sectional area, size of locks, depth of channel, and general condition, by divided ownership of different waterways, and by the deteriorating condition and insufficient depth of channel in some sections of through routes. It is never easy to predict whether a cargo loaded at one point may not prove too heavy to be taken through a distant point."

Almost as important as a deterrent influence is the lack of transport organisation and facilities on the part of the canal companies.

Lack of Transport Organisation. As has been seen, most of them are mere toll collectors; they make no effort to organise the business of transport in the way the railway companies have done. If a trader has a consignment to send, say, to London, he may pack it, address it to the consignee, notify the railway company that it is ready, and there, beyond paying the bill, his concern with the consignment comes to an end. The railway company will collect his consignment, load it into

trucks, carry it to the place specified and deliver it to the consignee without any further trouble to the trader. If necessary they will store the consignment until it is convenient for delivery to be taken. The canal companies, as a rule, render none of these services and afford no facilities. If the trader wants to send a consignment by canal he has to do all these things for himself, or to employ a forwarding agent to do them for him. The canal companies do not help him in the least ; they merely collect tolls from him.

It is not surprising, in view of all these defects that have been pointed out, that the canal system of the country has fallen into such a secondary position. There are exceptions, of course, such as the Manchester Ship Canal, but in the main the system is either inadequate or unfitted to perform the work which the advocates of water transport contend it could and should perform for the benefit of the country.

**Present Position
of Canals.**

CHAPTER XIV

ADVANTAGES OF WATER TRANSPORT

THE advantages of water transport are not so numerous as the defects of the waterways to which the last chapter was devoted.

They may be summed up in a sentence—that

General. transport of goods by water is cheaper than by land.

And in that sentence is the whole explanation of the agitation for an extensive improvement of inland waterways, both natural and artificial. Commercial competition becomes wider in its scope (is more international now than it was local two generations or so ago) and of greater intensity from year to year. Both manufacturers and merchants are constantly on the look out for anything which will reduce the cost not only of producing commodities but also of getting them to the desired markets. How almost hopeless seems to be the possibility of securing substantial reductions in railway rates has been seen in the preceding chapters, where the smallness of net earnings and the return on capital, both before and since the war and post-war increases, were demonstrated. From the business man's point of view this difficulty is a matter of direct everyday experience rather than an inference drawn from Blue Book returns, and so he turns with longing to the waterways for the reductions he requires and finds them inefficient for their purpose. Hence his desire for improved canals.

Why is water transport cheaper than land transport? The difference arises entirely from the medium used for transport. The

Cheapness of Water Transport. cheapest form of it, of course, is that by sea. There is no permanent way, or track, to construct for the ocean-going vessel; no gangs of men are required to keep it in repair. Permanent way has proved one of the most expensive things to acquire, construct and maintain for the railway companies. The shipping companies have no capital locked up in works of this kind. The only capital required is for the provision of the necessary vehicles, ships, and for the maintenance of the required organisation. Another advantage is the large bulk of cargo that can be moved in a single unit; larger than is practicable with any other form of transport. Inland waterways do not enjoy all

these advantages. The "permanent way" is not always provided by Nature as is the sea. It is, of course, in the case of the navigable rivers but even with these there is usually some expenditure required to adapt them for the most efficient service and to keep them in this condition. Artificial canals, however, have to be constructed and water provided for them, which means the acquisition of land for the waterway, and often also for storage purposes, and, of course, a considerable amount of navvying work in construction. And when made there are maintenance expenses to be provided for.

Still, even with artificial waterways, men of practical experience in their management, or use for transport, assert that the cost of water

**Cheaper
than Rail.**

transport is less than that incurred in connection with railways. The late J. E. Palmer, to whose work¹ reference has already been made, quoted a

director of Messrs. Tates, Ltd., sugar refiners, as telling the Royal Commission that "during five years the saving in freight averaged 14 per cent. by using canals, where they existed, instead of railways." Mr. Palmer gave three reasons why water transport is cheaper. The first of them is the smaller cost of permanent way, to which reference has already been made. This, of course, must vary with circumstances, the chief of which is the nature of the country through which the canal is to be cut. Dividing capital by mileage, an average of £57,744 per mile, is given for railways and of roughly £10,175 per mile for canals. Such figures, however, can hardly be accepted as conclusive because it is impossible to say how much canal capital has been mixed up with railway capital in the returns of the companies, but at any rate the difference is such as to allow room for a very large margin of error and still leave the comparison in favour of the canals. Another point to be remembered, however, is the difference in the conditions prevailing at the times when the canals and the railways were constructed. Canals preceded railways by roughly half a century, and for all practical purposes their construction ceased when railways began. The constructors of canals had the advantage of cheaper land and cheaper labour when they were creating their undertakings, and the extensions since made have been relatively insignificant. Railways beginning later had to pay more for their land and labour, and, having remained progressive, their extensions have become more

¹ *British Canals ; Problems and Possibilities*, by J. E. Palmer.

and more expensive with the passage of years. The money required for some of the recent extensions in London would have been sufficient to construct a whole canal in the days when this form of transport had its birth. It follows, of course, that if we were starting *de novo* to construct a canal system the capital cost would be very much greater than that of the original canals. The late J. E. Palmer expressed the opinion that "adequate barge canals in England would probably cost an average price per mile nearer to that of railways than to the original cost of the canals," but, he added, "enlarging existing canals would cost appreciably less."

To the smaller original cost of canals has to be added the further advantage that normally the cost of maintenance is also less. It

**Small Cost of
Maintenance
of Canals.**

seems impossible to obtain from the various Blue Books an exact and strictly comparable figure of average cost per mile for maintenance of canals and railways. According to the annual railway returns the cost for maintenance of "way and works" in the United Kingdom in 1925 was £23,993,962, which works out at £1,176 per mile of line. The canal returns give the cost of "management and maintenance" for the United Kingdom in 1905 as £800,251. As this figure applies to 4,673 miles of canals and waterways the average works out at £171 per mile. Later, in the final report of the Royal Commission, in the section where a new table is set up dealing only with companies which have made returns for each of the three years taken, there is also an attempt to analyse the expenditure in greater detail. In this section the purely maintenance expenses as distinct from management expenses for 3,148 miles of canals in the United Kingdom in 1905 amounted to £444,406, which averages £141 per mile. The two canal averages work out remarkably closely when the differences on which they are based are considered. Possibly it may be felt that there is sufficient correspondence between them to make them approximately reliable for the period to which they relate. It is greatly to be regretted that there are no financial returns since 1905, because there cannot possibly be any doubt that there has been an increase since then. Everything costs more these days, and it is incredible that the cost of canal maintenance has not increased just as other things have. The railway average cost is now 135 per cent. more than it was in 1912, and at the same ratio the cost for canals would be £291 ; but in

any case the difference is considerable, and there must obviously be a considerable margin in favour of the canals and in support of the argument of the advocates of canal reconstruction that the maintenance of canals is much less costly than railways.

In the same connection it is argued that increasing railway traffic means increased wear and tear of permanent way and vehicles, whereas in the case of waterways the extra wear and tear arising from increased traffic is practically negligible ; and the actual working experience of some of the canal companies, such as the Manchester Ship Canal, proves that this is so ; that a very substantial increase of traffic can be accommodated on a waterway without anything like an equivalent increase in the cost of maintenance.

The second advantage which contributes to bring about the cheapness of water as compared with land transport is the smaller cost, load for load, of boats than railway rolling-stock. The weight of a railway wagon is stated to range between half and three-quarters of the weight of the load it can carry, whilst canal boats can carry five or six times their own weight of goods. This means, of course, that a railway engine has to haul a very much greater proportion of non-paying load than that hauled on the canals, and correspondingly the proportion of wear and tear due to non-paying and paying load is so much the greater in connection with the railways. For the same reason the cost of construction in relation to carrying capacity is greatly in favour of the canal barge. Mr. Lionel B. Wells, formerly engineer to the Weaver Navigation, told the Royal Commission that—

“ a railway train loaded with 200 tons costs £3,360 and a steam barge to carry the same tonnage £1,600. The steam barge can tow three barges each carrying 200 tons and each costing £1,000. The cost, therefore, of the steam barge and the three dumb barges is £4,600. Railway rolling-stock to carry the same tonnage costs, Mr. Wells stated, £15,000.”¹

These, of course, are pre-war figures, and the cost of building both railway rolling stock and canal barges has greatly increased since those days. How much, it is impossible to say without detailed investigation, but probably the percentage increase has been roughly similar. In any case, the figures are interesting as

¹ J. E. Palmer : *British Canals*.

illustrating pre-war conditions, and if it is held that they are useless for present-day conditions it remains a self evident proposition that there is still a great disparity between the two sets of costs.

Still another advantage claimed is that it is more economical to carry goods when the unit of conveyance is a large one—

“ . . . for the ratio of expenses diminishes in proportion as the load increases to a greater extent with water transport than rail transport.”¹

The third advantage urged is that the cost of motive power is less on suitable waterways than on railways for the same load. This

Cost of Motive Power Less. proposition, of course, presupposes waterways of the most suitable sectional area and barges of the proper relationship to the sectional area if the best

results are to be obtained. Given these things, then, it is stated, the power required to move a given load on land will move five times that load on water. Actual comparative figures are not available, but Mr. Bartholomew, whose evidence has already been referred to, told the Royal Commission that on the Aire and Calder Navigation the cost of haulage in 1907 was : by steam tugs $\frac{1}{25}$ of a penny per mile and by horse haulage $\frac{1}{10}$ of a penny per mile. The cost of hauling coal in tank barges on the same waterway was $\frac{1}{11\frac{1}{2}}$ of a penny per mile.

It is not to be assumed that these contentions that water transport is cheaper than land are admitted without dispute. There are

Divergent Views. recognised authorities on the economics of transport who take quite the opposite view. Their arguments are that the results obtained in European

countries are not to be relied upon because they are not obtained as a result of free competition and because the physical characteristics of those countries are so different from those of the United Kingdom.

With regard to the competition, they point out that the governments of France and Germany, for instance, are either the absolute owners of both railways and canals or have a large financial interest in both. And because of this the competition of the railways is regulated and restricted with the avowed object of preventing it from destroying the competition of the inland waterways. The only free competition, it is urged, prevails in this country and in the United States of America. Here it is admitted that the canals have been unable in the past to compete with the railways and have

¹ J. E. Palmer.

only been able to retain a modicum of the transport business of the country as a whole. The answer of the canal advocates is that the success of the English railways in opposition to the waterways is not due to any inherent disadvantage of waterways but to the lack of enterprise on the part of the canal companies ; their antiquated unprogressive methods. In the few instances where the owners of canals have had the energy to modernise the waterways and work them with vigour their efforts have been rewarded by increased traffic and large profits. In the United States of America the opponents of canals assert that the free competition of railways has resulted in traffic being attracted from the artificial waterways notwithstanding the expenditure of immense sums of money in enlarging and improving those waterways so as to make them capable of dealing with traffic in the most satisfactory and economical manner. In the same way the railways of the United States of America have taken traffic from so magnificent a natural waterway as the Mississippi. The railway advocates, of course, admit that the river remains an immensely important highway of commerce but, they assert, if water transport possessed in fact all the advantages claimed for it in theory, then the railways would not have been capable of living in competition with such a river as the Mississippi, much less of obtaining traffic from it and of arresting the continuance of its rate of development.

Advocates of water transport maintain that valuable direct evidence as to its advantages is to be obtained from the experience of other countries, particularly the western European countries—Germany, Belgium, and France. It is, therefore, of value to summarise briefly what has been done in these countries, as outlined in the report of the Royal Commission. Holland is not dealt with in this connection because its waterways, though used largely for transport, are intended primarily for drainage rather than commercial use.

France began to construct canals long before we did in this country—early in the seventeenth century ; but the really material facts date from the close of the eighteenth century and the beginning of the nineteenth. The State in that period began the policy of granting financial assistance for the development of waterways. The policy pursued also included, as in the case of the railways, the granting of

Comparison with Foreign Countries.

French Canals.

concessions, but the system was not altogether successful because of the high dues which were charged, and in 1845 a law was passed authorising the State to repurchase the concessions. At first railway development had the same influence on canals as it had in this country. The tendency was to regard the future of water transport as hopeless. The traffic declined for this reason and because of the vigorous rate competition instituted by the railways. In other respects the hostile attitude of the railways who refused in any way to co-operate with the waterways damaged the latter. But the State had faith in the usefulness of the waterways and between 1831 and 1847 over £13,500,000 were spent on improvement and construction of rivers and canals. The greatest period of development, however, dates from 1879, when a comprehensive programme was adopted involving a cost of £28,000,000. As recently as 1903 a new programme was adopted under which another £8,250,000 were to be spent. From 1841 to 1900 the amount actually spent by the State was : on improvement and construction, £61,603,237 ; on maintenance and heavier repairs, £30,384,073—Total, £91,987,310. In return for her expenditure she possessed, in 1905, 1,306 miles of rivers and 1,671 miles of canals, together 2,977 miles, with a minimum dimension capable of accommodating boats of 300 tons capacity. The tonnage carried grew from 18,000,000 tons in 1880 to 34,144,000 tons in 1906, an increase of 90 per cent. The ton mileage for the same period grew from 1,244,000,000 to 3,163,000,000, the increase in this case being 154 per cent. ; and the mean length of travel from 62 to 92 miles. In the same period the tonnage carried by the railways grew from 80,774,000 to 139,000,000, an increase of 72 per cent. and the ton mileage from 6,417 millions to 10,959 millions, or 71 per cent., while the mean length of travel having started at 79 miles rose to 81 miles and fell back again to 79 miles. The waterways have been toll-free since 1879, and the average freight charges are described as “low . . . much lower than those in England, which, however, include tolls.” The railway rates are usually kept 20 per cent. above the water rates with which they compete.

The Belgian waterways system is described as one of the most intensely developed in the world. The total length of the system (canals, and canalised and open rivers) is 1,345 miles, of which 900 miles are State-owned and 115 miles are owned by provinces,

communes and concessionaires. The total expenditure of the State from 1831 to 1905 on construction and the larger works of improvement is given as £15,810,000, and the total cost of current maintenance and improvements as £4,958,000. The canals are not toll-free but the dues are light. The attitude of the Government is admirably summed up in the following paragraph from the report of the Royal Commission—

**Belgian
Canals.**

“ The annual cost of maintaining the waterways is almost met by the receipts from the dues, but the State expects no return or profit upon the money spent upon construction and large improvements. It is considered in Belgium, as in France, that these works will increase the commerce and wealth of the nation, and that the increase of commerce and wealth will strengthen the national public revenue.”

The Government adjust the railway rates (the railways are chiefly their property) so as to prevent waterway carriers from being crushed by competition. The total tonnage of goods and merchandise carried on the waterways increased from 25,242,000 tons in 1890 to 53,345,000 in 1905, or 111·3 per cent. ; the ton mileage grew in the same period from 358 to 708 millions. Between 1888 and 1905 railway traffic grew from 40,352,000 tons to 65,319,000 tons. Of the total traffic (rail and water) in 1888, 38 per cent. was water-borne and 62 per cent. rail-borne. In 1905 the proportions were: water-borne 45 per cent., rail-borne 55 per cent. The average freight on the waterways (including dues) is about 0·37d. per mile, and this is 60 per cent. of the railway rates.

An interesting comparison between the circumstances of Belgium and England is given as follows—

“ In both cases there are important mining and industrial districts situated at about the same distance from the nearest great port. Liège has sometimes been called the Birmingham of Belgium. But Liège is provided with cheap and effective water transport. A cargo of minerals can be sent from Antwerp to Liège, a distance by water of 95 miles at a freight, including dues, of 2s. 4½d. a ton, *i.e.*, a freight per ton per mile of about 0·30d. A cargo of iron rails can be sent from Liège to Antwerp for export at 2s. 7d. per ton or 0·33d. per ton per mile. The goods can be taken from or to the side of the sea-going ships in the same barge which carries them to or from Liège. Not content with these favourable conditions as compared with anything in England, the Belgian Government are . . . undertaking canal improvements to enable barges carrying cargoes of 1,000 tons to navigate between Liège and Antwerp. Birmingham is at nearly the same distance from the ports of Liverpool and Bristol as Liège is from Antwerp. To

**Comparison
between England
and Belgium.**

convey the same goods between Birmingham and either of these ports by water would cost about thrice as much per ton per mile as the transport between Liège and Antwerp, and it would moreover be necessary to incur the cost and delay of transshipment from one boat to another on the way. If it is also taken into consideration that the English railway rates are higher than Belgian, it will be seen that the English Midland manufacturer is, in respect of rates for transport, at a considerable disadvantage in competing with his Belgian rival both in regard to the import of raw material and the export of manufactured produce."

In Germany the introduction of railways was the cause of the same stagnation of waterways as in other countries but "renewed attention began to be paid to this means of transport about the middle of the seventies," and this led to "a progressive development in the character and importance of the works for improving the conditions on the navigable waterways, and to a gradual but very considerable increase of the expenditure thereon." The scheme of development was planned so as to secure east of Berlin waterways navigable for 400 ton boats and west of Berlin 600 ton boats. Figures as to total length of the German waterways vary from 7,700 to 8,500 miles, according to the inclusion of certain small canals and estuaries, but the total length on which the traffic is of importance and its amount can be stated in figures is 6,200 miles. The free navigable rivers are of more importance than the canals in Germany. The rivers are public property, and with a few exceptions the construction of the canals has been carried out by the State and they are administered by the State. The construction of harbours and wharves for commerce is usually left to the municipal authorities. The result of this enterprise has been the attraction of industrial establishments to the banks of the waterways, where many of them have constructed their own works, and it has promoted the decentralisation of industry.

In the Prussian portion of Germany the control of all State-owned waterways, as in France and Belgium, is in the hands of a department of the Ministry of Public Works. By far the larger portion of the waterways of Germany are in Prussia, and that country, from 1815 to 1906, spent £13,181,000 on improving the free rivers and £13,200,000 on the construction and improvement of canalised rivers, and in 1905 alone spent £804,240 on maintenance of the waterways.

The German Canals.

The Prussian Canals.

In some cases the free rivers, such as the Rhine and Elbe, are free from dues, and those on the canalised rivers and canals are low ; on the Mark waterways from 0·074d. to 0·015d. per ton mile ; on the Main from 0·124d. to 0·062d. ; on the Dartmund-Ems canal from 0·068d. to 0·010d. The total revenue derived from traffic etc., in 1905 was £340,700, so that the excess of expenditure over receipts was £463,540. The State also foregoes interest on the capital sums expended on improvements. As the total capital expenditure has been £26,500,000 the interest charge on this at $3\frac{1}{2}$ per cent. would be £927,550, which, added to the deficit mentioned above, makes a total of £1,391,000, which is equivalent to an annual State subsidy to the traffic on the waterways. To make the traffic pay maintenance and interest would mean an increase of dues from £340,000 to £1,391,000 per annum. The deficit is attributable to the rivers being free. On the canalised rivers and canals the income from dues just covers the cost of maintenance.

From 1885 to 1905 the traffic on German waterways increased from 2,976 to 9,300 million ton miles, the actual increase being from 13,600,000 tons to 67,000,000 tons. In a period of

**Increase of
Traffic in
Germany.**

twenty years, therefore, the waterways traffic increased more than three-fold, while the railway tonnage increased more than two and a half in the same period. Taking the revenue from railways and canals together the State obtains 7 per cent. return on the capital invested. The capacity of the barges used on the Rhine goes up to 2,000 or even 2,500 tons, while the 600 ton barge is becoming the typical vessel on the Elbe, Weser and Ems. Still further constructive work was sanctioned in 1905 at an estimated cost of £16,728,750, and the 600 ton barge will be the standard to which the new waterways will be made. The policy of the Government in this case is not only to make the canals self-supporting by means of the dues, but also to provide $3\frac{1}{2}$ per cent. interest on the capital expended. Other German States were considering extensive navigation schemes at the time of the report.

These brief summaries of the principal points of the report concerning France, Belgium and Germany have been reproduced mainly for the purpose of supplying concise information as to what has been done by some of our greatest commercial rivals. At the same time, they afford proof of the contention that properly

developed waterways can be made to play an immensely important part in national systems of transport. The facts are also evi-

**Continental
Results not
Applicable.**

dence of the faith which the governments of these countries have in the utility of water transport. They have thought it worth while to spend millions of pounds on the improvement of natural waterways and the creation of artificial ones ; to keep the two kinds of transport alive and vigorously working side by side. Obviously they must believe that some economic advantage is to be gained or their policy would have been different. Still, when all this is admitted the critics are legitimately entitled to say that the facts furnish no real argument in favour of the superior advantages of water transport. The canal traffic is all "bounty fed." Large sums have been spent on construction and improvement and the Governments concerned either derive no financial return, or at best a microscopical one, on the money they have expended. In addition the waterways are protected from the severity of railway competition. They retain their traffic, not because it is proved that on their merits, or intrinsically, they furnish a cheaper means of transport, but because the railways are not permitted to attempt to get it from them. Conditions in this country are quite different. To bring them into line would mean a complete reversal of national policy. The Government, according to the views of the railway advocates, could not well subsidise canals and at the same time restrain the railways from competing with them. Before they could do this they would, in fairness and justice, at least have to acquire the railways. Under any other conditions they would not merely lay themselves open to a charge of gross unfairness, but they would be provoking a widespread financial crisis, the disastrous effects of which cannot be estimated.

CHAPTER XV

RECOMMENDATIONS OF THE ROYAL COMMISSION

It remains now to set out as briefly as possible the recommendations of the Royal Commission appointed in March, 1906, to enquire into

General. and report on the canals and inland navigations of the United Kingdom. The fourth and final report (Vol. VII of the publications of the Commission) was issued in December, 1909. The terms of reference were—

“to enquire into the canals and navigations of the United Kingdom, and to report on—

(1) Their present condition and financial position ;

(2) The causes which have operated to prevent the carrying out of improvements by private enterprise, and whether such causes are removable by legislation ;

(3) Facilities, improvements and extensions desirable in order to complete a system of through communication by water between centres of commercial, industrial and agricultural importance, and between such centres and the sea ;

(4) The prospect of benefit to the trade of the country compatible with a reasonable return on the probable cost ; and

(5) The expediency of canals being made or acquired by public bodies or trusts, and the methods by which funds for the purpose could be obtained and secured ; and what should be the system of control and management of such bodies or trusts.”

Sufficient has already been written concerning the first and second terms of reference except that the latter may be slightly emphasised

Why Private Enterprise Fails. by three points from the report. In explanation of the causes which have operated to prevent the carrying out of improvements by private enterprise it is stated : “most of the independent canal companies have not the means to make large improvements, and for the most part neither the will nor the energy,” and it is not practicable to raise funds by private enterprise because there is “a complete want of faith in the future of canals on the part of that investing public who so freely send out their money for railway construction and mining enterprise in distant parts of the world.” The Commission thought that some of the causes might be removed by legislation if the parliamentary procedure for purposes such as amalgamations,

etc., were made cheaper, but, they added, the obstacles to improvement "cannot be removed . . . by legislation on minor points, although such legislation may be a necessary feature in a larger scheme of reform."

On the third term of reference (facilities and improvements desirable, etc.), the Commission came to the conclusion that as a first

step in any comprehensive scheme of waterway

"The Cross " development it would be desirable to take what has
Recommended. been called "the cross" in hand for gradual but

continuous improvement. "The cross," as will

be seen from the map reproduced, connects the Thames, the Severn, the Mersey and the Humber, giving access to all these rivers from the Midlands. The routes should be treated as great highways traversing central England. They should be amalgamated under a single control and should undergo such improvements as would make them efficient means of transporting a volume of long distance traffic far larger than that which they at present attract. If these improvements are undertaken many of the great manufacturing and consuming centres of England will be linked with each other, and with the great seaports, by waterways permitting the cheap transport of minerals and goods not requiring the highest speed.

"The Midland districts will have cheap access to and from the four great estuaries for the import of raw material and the export of certain classes of products ; and coal may be brought to London by improved waterways from the coalfields of South Staffordshire and from those in the counties of Warwick, Nottingham, and Derby."

The Commission thought that with necessary modifications the general policy of waterway improvements adopted on the continent

Suggested can be applied to this country, but their investiga-
Dimensions. tions into the requirements of commerce, the water supply available, cost of construction, etc., brought

them to the conclusion that it would not be practicable to adopt in this country so large a standard of canal dimensions as that which has been adopted for German and part of the Belgian waterways or even, perhaps, so large as the French and the other Belgian waterways. They suggest that the arm of the cross from Birmingham and Leicester to London (which they call route A) should be improved to the 100 ton standard ; that from Leicester, Burton and Nottingham to the Humber (route B) should be improved to the 300 ton standard between Leicester and Fradley junction respectively

and Nottingham, and from Nottingham to the Humber so as to accommodate 750 ton vessels; that from Wolverhampton and Birmingham to the Mersey (route C) to the 100 ton standard; and that from Wolverhampton and Birmingham to the Severn (route D) to the 100 ton standard from Wolverhampton to Stourport and from Birmingham *via* Droitwich to the Severn at Hawford, while the Severn should be improved to a 750 ton standard up to Worcester and to 600 tons up to Stourport.

On the fourth term of reference (the prospect of benefit to trade compatible with a reasonable return on the probable cost) the Commissioners briefly sum up their views as follows—

**Prospect of
Benefit to Trade.**

“ The Commission as a whole are unable to state that in their opinion there would be a reasonable direct return on such probable expenditure. Some of the Commissioners would give a negative and some an affirmative answer to the question whether there would be an adequate direct return.”

If the matter could be considered simply with regard to benefit to commerce and industry they would recommend the larger 300 ton scheme, but as the prospect of a reasonable direct return on the capital expended, and that presumably within reasonable time, must be considered, they do not think they can go beyond the expression of the opinion that if “ the cross ” were brought under single control and improved, and the minor canals were improved, these measures would result in great benefit to the trade of the country. They therefore base their further observations on the supposition that the smaller scheme (100 ton standard, with a higher standard for the rivers) will be adopted. They feel convinced that the more or less gradual application of the improvements involved in that scheme would greatly benefit consumers of coal and other commodities. The tendency of manufacturers to leave the Midlands for the coast would probably be arrested if cheaper rates could be provided to and from the ports.

To the argument that it is not fair to give any kind of economic State aid to certain parts of the country unless the benefit can be

extended to the whole country, they say that Scotland and Ireland have both received such aid, and that if attention had been paid to such an argument

the expenditure of public money in other countries would have been prevented. The Governments of these other countries, however,

**Local Favouritism
by State Aid.**

appear to believe that if one part of a country is made more rich and prosperous the interests of the whole cannot fail to be promoted. And in this country it may be held that improvements affecting certain districts would be of great advantage to the country as a whole.

Coming to the question of cost, the report tabulates in detail the total cost of improvement and the annual charges for the four routes exclusive of their branches, which might subsequently be acquired and exclusive also (which is most important) of the cost of acquisition. The table deals with 533·84 miles and gives the following totals—

Cost of improvement	£14,756,923
Cost of water supply	481,986
Total	£15,238,909
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Annual charge for interest and sinking fund on total cost at £3 12s. 3d. per cent. . .	£550,505
Annual cost of pumping	33,904
Annual cost of management and maintenance	182,919
Total	£767,328

Obviously figures such as these must be regarded as defective because of the two omissions specified, particularly the cost of acquisition. Part of the defect is remedied, however, in a second table, which gives the total cost of improvement and annual charges for the four routes and their branches, cost of acquisition again being excluded. In this case, also, the Birmingham Canal, as a whole, is included though it is not contemplated to raise the whole of it to the standard of the large capacity canals, but merely to acquire it and work it as a feeder. This gives a total of 1048·77 miles and the totals as before are—

**Insufficiency
of Figures.**

Cost of improvement	£16,951,924
Cost of water supply	581,986
Total	£17,533,910
<hr/>	
Annual charge for interest and sinking fund on total cost at £3 12s. 3d. per cent. . .	£633,411
Annual cost of pumping	65,303
Annual cost of management and maintenance	305,467
Total	£1,004,181

This, however, is not the whole annual charge. A sum of £93,844

per annum of "other expenditure" (not explained in the final report) has to be added. The gross income of the four routes at present is: from tolls, £434,509; from other sources, £133,462; total, £567,971. In estimating the future revenue required from tolls the following figures are given—

Total annual charge and "other expenses" .	£1,098,025
Less present revenue from "other sources" .	133,462
	<hr/>
Future revenue required from tolls . . .	<u>£964,563</u>

As to the quantity of traffic required to produce this £964,563 per annum the Commission say—

" . . . if we assume that the average toll on all these waterways will not exceed 0.2d. per mile the total ton-miles of traffic required will amount to 1,158,000,000. Distributed equally over the 1,048 miles of the routes and branches this works out at 1,104,000 tons per mile. If distributed over the main lines only, viz., 533 miles, it works out at 2,173,000 tons per mile. The existing tonnage on these waterways amounts to 16,600,000 tons. If it is assumed that the average travel is 12 miles the present traffic amounts to 199,200,000 ton miles. Additional traffic would, therefore, be required amounting to 958,800,000 ton-miles to meet the total expenditure when, in the course of years, the whole scheme of improvement had been completed."

The Commission

"do not believe that any very exact estimate of the cost of transport on the improved waterways can be arrived at. But upon the figures

Can an exact Estimate of Cost of Transport be Arrived at?

which have been placed before them . . . there is much reason to believe that, if on improved canals trainloads of 260 tons could be conveyed in shorter time than loads of 50 to 60 tons are conveyed on the present canals, tolls remaining at their existing level, there would be a large reduction on the cost per ton mile of conveyance. This reduction in the cost of transport would be effected through the competition of carriers who would be enabled to carry at less cost on a larger and better highway in consequence of the increase in the weight of cargoes and the saving of time and labour. If, however, the authority controlling the amalgamated waterways were to reduce the toll per ton per mile the total cost of conveying cargo would be still further reduced."

The Commission recommended that the future policy as regards tolls should be

Future Policy. " . . . to render the unified and improved waterways self-supporting so far as concerns maintenance and management and interest on capital expended on improvement. But it may well be considered whether with a fair regard to existing transport interests, the State might not wisely take upon

itself the cost of acquisition of such waterways as may be needed for each successive scheme of improvement."

If this view is adopted they recommend that

" . . . this State-aid should be given by way either of free grant or of advances with a long-deferred term for repayment, or by a combination of both these methods.

" In support of such a policy it may be urged that the present condition of canals is, to a great extent, due to legislative errors and neglect in the past and that it is desirable to repair these errors, which have undoubtedly put our national industry at a disadvantage in competing with foreign rivals, and to promote the lowering of rates for inland transport, especially of coal and raw materials."

The fifth and final term of reference concerns the question of control, assuming that the work of unification and improvement is carried out. As to this the Commission do not

**Question of
Control.**

favour the plan that the State should make the improvements and lease the canals to the present canal companies or an amalgamation of them, because they do not think it possible to evolve a capable body out of them. They recommend that the English and Welsh waterways should be placed under the direct control of a Waterways Board who should submit schemes for (a) acquisition, and (b) improvement of waterways, to the Development Commissioners appointed under the Development and Road Improvements Funds Act. These latter Commissioners may make recommendations to the Treasury on which advances may be made to public authorities for various specified purposes, one of which is " the construction and improvement of inland navigations."

As a conclusion to this section of their report the Commission say that they have

**Limit of Utility
Reached in
England and
Wales.**

" . . . realised more and more as their enquiry has proceeded how hopeless it would be to expect any thing from the waterways system of England and Wales in the future for the benefit of trade and industry, if the waterways were left in their present disunited and unimproved condition. With a few notable exceptions the canals at least would become less and less efficient and useful ; and many would swell the list, as years went on, of disused or derelict canals. Thus, a system of transport which in foreign countries has become of great value to trade, as a result of measures of unification and improvement, would in this country be practically lost."

They have also

" . . . become more and more convinced that the measures which they propose for the unification, reconstruction, and improvement, and for

the central administration of the more important waterways, if carried out gradually and continuously, are not only the best steps that can be taken to save the system from destruction, but also to afford a reasonable prospect of benefit to the trade of the country commensurate with the expenditure to be undertaken. Some of the Commissioners, as stated, do not believe that in addition to this benefit an adequate return would be obtained on the capital outlay. Other Commissioners look forward to the creation of a traffic so considerable that, in course of time, an adequate return direct, as well as indirect, on the outlay may fairly be anticipated."

Finally, it is recommended that the financial procedure for acquiring the waterways should resemble that adopted in the Port of London Act, 1908. The properties of the dock

**Method of
Acquisition.**

companies were vested in the new port authority which was authorised to issue port stock in substitution for the existing stock of the dock companies. They further recommend (1) that the stock issued to acquire canals should be in the nature of a free grant, or of a loan with long deferred date of repayment of interest and capital, or a combination of both free grant and loan ; (2) that the stock issued or loans raised by the new authority for the purpose of carrying out the works of improvement of waterways should be guaranteed by the State ; (3) that the commencement of the sinking fund for the redemption of the last mentioned stock or loans should be deferred for a period of years.

If, for financial or other reasons, it should not be thought advisable to commence the works of improvement at once they still think that in any case, and as a first and most important step the acquisition and unification of these waterways by the Waterways Board should be

**Waterways
Board.**

carried out. This step by itself, and apart from any large works of improvement, would be an appreciable benefit to commerce ; and by reason of the economies resulting from the substitution of a single large administration for many small ones, might enable a certain though not a large, reduction of tolls to be effected.

There are also recommendations as to other English and Welsh waterways, and as to those of Scotland and Ireland, but as the main problem begins and ends with "the cross"

**Other
Recommendations.**

the extracts may be left at that. It should be added, however, that there are two or three minority reports from members of the Royal Commission who did not agree with the whole report, or who dissented from it entirely.

Whatever may be thought of some aspects of the report it will be generally admitted that from other points of view it is a most valuable document. Taken in conjunction with the other six volumes of evidence and statistics it is a thorough investigation of a difficult subject, and it contains much information never before available.

**Value of
Commission's
Report.**

But when the conclusions arrived at are considered it must appear even to the most impartial student as rather weak. Indecision seems to be one of its characteristics. Reading "between the lines" there is a suggestion that some of the Commissioners wanted to recommend the 300-ton scheme for "the cross," but in the end followed a policy of mere expediency and came down to the smaller canals. Again, there is weakness in the manner in which the question of direct return is dealt with, and because the cost of acquiring the canals is ignored. It would seem to be essential that if the scheme is to obtain the most widespread support there should be the fullest possible information as to the total cost. It is not sufficient to say that there would be an immediate outlay of £15,238,909 to be ultimately increased to £17,533,910 when all the valuable branch feeder canals are acquired and improved. Seventeen and a half millions, apparently, is not half the cost. In their report the Commission have not taken the trouble to set out the capital of the companies proposed to be taken over to form "the cross," and its branches, which appears to be just over £17,250,000. And this is bare capital. It makes no allowance for compensation for compulsory purchase in the case of canals, such as the Birmingham, where the shareholders are in enjoyment of a steady dividend. The omission is another instance of the defects of the statistics compiled for the Commission. Nor is there anything convincing in the way the report deals with the raising of the increased revenue which would be required to meet the cost of improvements, management and maintenance—£964,563 per annum. Why is the figure 0·2d. per ton per mile selected as the future average toll? On what is it based? No information is given. We are merely told that it is a hypothetical figure and that if it is accepted then there would be required 958,800,000 ton miles of traffic at that average price to cover the cost of improvements, maintenance and management. In other words, the present traffic would require to be more than quadrupled. Possibly such an

increase would not be too large to be attained on improved canals, but in view of the manner in which it is arrived at is the figure worth the paper it is printed on? No one can say. Controversy is certain to be raised as to whether the State should acquire the canals and forego any return on the capital thus expended. The point need not be discussed. It raises a new principle which is altogether opposed to past national policy.

On one point, however, there appears to be no possible room for doubt—the unification and improvement of the canals would be of

**Canals and
Local Industries.** immense benefit to the industries in the localities affected. It would give them a valuable alternative means of transport, and if “the cross” were worked in sympathy with the ideas of the Royal Commission it cannot be doubted that the new transport would be relatively cheap. It might happen that if the railways were put under no restraint as to competition they would reduce their rates in all the districts touched by water competition with the sole object of killing that competition, and the Royal Commission estimates of the probable return would be badly at fault. In such a case the annual loss to the State, apart from the lack of interest on capital which the report recommends, would be considerable. Still, even so, there would remain a distinct benefit to the traders concerned in the possession of much cheaper transport by rail as the result of the improvements made in the waterways. On the other hand, there would be yet another set off to be made when attempting to estimate the balance of advantages. It is quite probable that railway competition, such as would be necessary to accomplish such a result, would so seriously affect profits as to cause dividends to be reduced. In that case there would be not only the national loss but also the loss to the railway shareholders concerned.

It will be realised from these few concluding comments on the report how extremely complex is the problem to be faced. It is not proposed here to attempt a solution. The object in view has been to set out the whole question as fairly and comprehensively as possible so that its difficulties might be realised, and so that, perhaps, some small measure of guidance may be afforded to students of the problem.

CHAPTER XVI

SINCE THE ROYAL COMMISSION'S REPORT

SEVENTEEN years have rolled by since the Royal Commission's Report was presented. What has happened since then? Practically nothing. From some points of view this is not surprising. The period has included four years of the most exhausting war, physically and financially, that probably the world has ever known; and we as a nation emerged from that war with a national debt (funded and unfunded) which had grown from 650 millions to 7,500 millions in five years; a debt which in the after-war years mounted up to 7,828 millions, and still stood at the conclusion of the 1924-25 financial year at 7,597 millions. He would be a very sanguine person who expected to get State money for canal improvements during such a period as this has been.

Nor is it unfair to say that "practically nothing" has been done because of the extraordinarily invertibrate report which the Royal Commission issued. It gave a very poor lead, if any, to public opinion. Nothing was said about the cost of acquiring the canals and placing them under the control of a Waterways Board for England and Wales, and nothing convincing concerning the prospect of building up such a volume of traffic on the waterways as would afford even a moderate return on the capital which the nation would have had to sink in the undertaking if the Cross scheme had been carried out on the lines suggested. There was nothing convincing about it. To interest private capital seemed impossible in view of the nature of the Report, and as a nation we have not had the money available even to allow us to think of tackling such a large undertaking.

The subject has not been entirely shelved, however. In 1920-21 there was a Committee appointed by the Ministry of Transport, known as Mr. Neville Chamberlain's Committee, he having been chairman. The terms of reference were: To consider and report as to—

**Mr. Neville
Chamberlain's
Committee.**

(1) What portions, if any, of the inland waterway system of the country should be acquired by the Ministry of Transport with a view to improvement and on what terms?

(2) What should be the form of ownership of such acquired portions, whether under the State, through a Department of the Ministry of Transport, or through a regional trust or any other method? If a trust be recommended, what should be its constitution and the nature of its governing body?

(3) What improvement should be carried out in such acquired portions? What would be the cost of the improvement and how should the necessary funds be raised? Whether such acquired or improved portions would become self supporting, and if not, what deficit would be involved; also what indirect advantage would be obtained to compensate therefor?

(4) What method should be adopted to ensure that any improvement in the value of the frontages should be secured in part, at least, to the body carrying out the improvement to the waterway?

(5) In what manner could co-operation best be developed between transport by water and transport by rail or road?

This Committee presented two interim reports (in February and June, 1921), and then seems to have "fizzled out," as was not surprising in view of the conditions prevailing at that time when the national debt was still being piled up, and when the whole transport industry as indicated by the condition of the railways was in a very sorry condition. The first interim report was not printed, nor does there appear to have been any adequate reference to it in the public press, but as by courtesy of the Ministry of Transport we have been supplied with a complete copy, it may be useful to give here a fairly comprehensive summary.

The Committee state that although they are far from completion of their investigations there are certain circumstances connected with the navigation of the River Trent between Nottingham and Newark which they consider it advisable to bring to the notice of the Minister of Transport at once. The Trent is under the jurisdiction of the Humber Conservancy Board from the Trent falls where it enters the Humber up to the town of Gainsborough. At Gainsborough begins the jurisdiction of the Trent Navigation Company, which extends to a point some 12 miles above Nottingham.

**A First Interim
Report.**

As far as Newark the navigation is in a very efficient condition, but between that town and Nottingham lie 15 miles of very bad navigation in which the available draft of water is sometimes not more than 2 feet. The river, in this part of its course, is not only shallow but rapid, the fall being as much as 19 in. in a mile. The result is that vessels suitable to navigate the Humber tideway can

go no farther than Newark, where their cargoes have to be transhipped to narrow boats in order to get up to Nottingham. Naturally this circumstance renders the navigation of very little value to Nottingham.

In 1906 the Trent Navigation Company secured an Act of Parliament empowering them to improve the navigation by widening and deepening the Trent, and by constructing new cuts, weirs, locks, etc. Part of this work was carried out, and it was made possible to take vessels of 120 tons up the river to Newark. Owing to financial reasons the remainder of the work was not proceeded with, and in 1914 Nottingham City Council took the matter in hand. The Navigation Company agreed to transfer to the Corporation the navigation between Trent Bridge, Nottingham, and the Averham Weir above Newark. The Nether Lock at Newark was to be constructed by the company, but the Corporation agreed to lend them £10,000. The remainder of the works, estimated to cost £150,000, were to be constructed by the Corporation, and the National Development Commissioners agreed to lend the Corporation £50,000 on terms. These arrangements were embodied in an Act of Parliament passed in 1915. The war prevented anything further from being done up to the time of the Committee's report in February, 1921, and in the meantime it was estimated that the cost of carrying out the work would be increased to £450,000, and the Committee thought it doubtful whether the Corporation could borrow the money on reasonable terms.

In view of this the Committee, being satisfied that all the improvements contemplated should be carried through at the earliest

**Beneficial
Results of
Trent
Improvement.**

possible moment, suggested the division of the work into sections, and the construction of one or more sections at a time. Bearing in mind that the improvement of the river up to Newark resulted in an immediate expansion of trade by the river, improvements which would put Nottingham into a similar position could hardly fail to produce much greater results. The Committee had no hesitation in predicting that the suggested development would amply justify the outlay upon it.

The Committee added that at a later stage of their investigations they might put before the Minister of Transport proposals with regard to ownership and administration, which might ultimately

result in a considerable development of the water route between the Humber Ports and the Midlands. It would clearly be undesirable to do anything at this stage which would hamper such development in the future, and they therefore recommended that it should be made a condition of any assistance given to the Corporation of Nottingham in carrying out any section of the works mentioned, that they should undertake to convey their powers over, and property in, the navigation to any new Board, Company, or Trust which might hereafter be set up to control the whole navigable portion of the route.

The second interim report seems to have been provoked by the Railways Bill which eventually became the Act of 1921. The

**A Second
Interim Report.**

introduction of that Bill in the House of Commons, the Committee said, made it desirable that they should immediately lay before the Minister of Transport the broad outlines of the policy in regard to canals which, in their opinion, should be followed in the future. The Railways Bill provided for a great strengthening of the railways by amalgamating them into groups, and it appeared necessary to the Committee that the future of the other forms of transport should be considered, and, if necessary, safeguarded at this critical stage.

The first essential to the progress of the waterways was unification of ownership, and they were convinced that if certain important

**Unification of
Ownership
Essential.**

waterways were given a fair chance, and put under unified and competent management, they would be capable of playing a very important part in the transport of the country. It was clear that no experiment could be expected to succeed unless it was on a scale large enough to give scope for adequate management. Nationalization of the whole canal system they put aside as involving liabilities greater than the nation is prepared to face, but if it were possible to divide the various waterways into groups, each centring round some important traffic route, it appeared to them that the conditions necessary for a successful experiment would be attained without incurring the risks involved in a national scheme. On consideration of the principal waterways of the country they seemed naturally to arrange themselves into seven groups or systems as follows—

- (1) The river Trent and its connections.
- (2) The Yorkshire canals.

- (3) The Lancashire canals.
- (4) The canals joining Liverpool with the Midlands.
- (5) The river Severn with its connections.
- (6) The river Thames and its connections with the Midlands and Bristol.

(7) The Birmingham canal and its connections in the Midlands.

The policy they recommended as best suited to the needs and conditions of the times, contemplated the ultimate fusion of all the waterway connection in each of these groups into a single ownership, but they recommended that a beginning should be made with one or two only of the groups, selecting those which presented the best prospect of success with the least amount of capital expenditure. The other groups would be proceeded with if, and when, their formation appeared justifiable in the light of the experience gained.

**Ultimate Single
Ownership for the
Whole Country.**

A mere amalgamation of the existing canal owners, however, would not provide the means of making the experiment, and they were accordingly driven to the only remaining alternative, namely, a Public Trust, suitably constituted and supplementing its financial resources by the aid partly of State and partly of local authorities having a special interest in the development of the group. While they did not suggest that any group should permanently receive specially favoured treatment if it could not maintain its position on an economic basis, they thought it necessary that it should be protected from unfair competition during its earlier years, and they considered it essential that special concessions in either rates or conditions, given by railway companies for the purpose of cutting out water competition, should be barred by Statute, and the necessary provision should be inserted in the Railways Bill then before Parliament.

The Committee contemplated that the Public Trusts should take the form of statutory bodies composed of representatives of the Ministry of Transport, the local authorities of the area covered by the group users of the waterway, chambers of commerce, and the stockholders. The latter would comprise the original owners of the various waterways in the group, who would receive Trust Stock in return for their interest, and also subscribers to the capital of the

**Composition of
the Trusts.**

Trust whether in the form of Debentures or Preferred or Deferred Stock. While not being given a monopoly, it was essential that the Trust should have power to carry and conduct the business of carriers.

The river Trent and its connections stood out as pre-eminently suitable for the first experiment, and they proposed that the following waterways should be regarded as within the "sphere of influence" of the proposed Trust: The river Trent from Trent Junction to Keadby; the Chesterfield Canal; the Foss Dyke Canal; the Grantham Canal; the Nottingham Canal; the Cromford Canal; The Erewash Canal; the Derby Canal; the Trent from Nottingham to the Trent and Mersey Canal; the Trent and Mersey canal from the Trent to Fradley Junction; the Loughborough Navigation, and the Leicester Navigation. But some further investigation would be necessary before deciding which of these waterways should be acquired by the Trent.

There was one important dissentient from the report—the late Sir William M. Acworth to whose eminence in the sphere of transport

**An Important
Dissentient.**

several references have been made in earlier chapters. He thought an experiment at the moment would be premature, and suggested that before embarking on it evidence should be obtained from other countries as to how far traffic on artificial waterways in a district fully provided with railways has an economic future. He also thought further investigation should be made in this country as to the volume and composition of the traffic in the basin of the Trent, and of the actual out-of-pocket cost of carrying traffic of different kinds in 120 ton barges between, say, Hull and Goole on the one hand, and Nottingham on the other. A comparison of these costs with the existing railway rates for similar traffics would afford at least some indication of the maximum possible inducement there would be for traders to transfer their trade from the railways to the waterway. Finally, while he agreed that the local authorities along the route should be permitted to subscribe towards the cost if they desired to do so, he did not think any contribution should be made by the State in view of the State's policy and obligations towards the railways.

This seems to be the last of the Committee's reports, and what has happened to it since no one appears to know. Probably in the

changes of Government which have taken place since 1921 it has lapsed and its resuscitation has not been thought worth while. Another circumstance which may have some bearing on the point is the fact that Mr. Neville Chamberlain, M.P., who perhaps may be correctly described as the main driving force behind the canal restoration agitation in recent years, now has other very absorbing pre-occupations which prevent him from giving the subject the same amount of attention that he did formerly. In any case, nothing seems to have been done as the result of the interim reports summarised above. The city of Nottingham has taken in hand and completed the improvement of the river Trent, but that scheme was contemplated and even got as far as the preliminaries before the war, so that it cannot be attributed in any way to the influence of the report. In fact, one of the main objects of the report seems to have been to give the Committee's blessing to the Nottingham venture. But though the Trent has been improved, the proposed Trent group under the proposed Public Trust has not been formed, nor have any of the other proposed Public Trusts. On the whole the supremeness of Parliament, or inability to act because of want of funds, must be very disappointing to everyone interested in canal development. There has been very thorough inquiry, and the subject has received ample consideration. Everything necessary to be done is known (except, of course, what it is likely to cost), but nothing further is done.

Outside Parliament, however, Nottingham has done what the canal advocates regard as a distinctly good and important thing in improving the Trent navigations. As long ago as 1783 there was a Trent Navigation Company, and through all the period that has elapsed since then, there has been evidence from time to time that the people interested have been keenly alive to the importance of maintaining and increasing the usefulness of the river. The history of the 140 odd years has been stated to "offer four clearly distinguishable phases. One embracing the natural period when little in the way of artificial improvement was projected; another when the Trent Navigation Companies were making efforts to develop facilities for transport; a third—and this overlapping—when the Corporation of Nottingham, fearful of losing control to the prejudice of the community, sought to restrain the issue of powers to the

**Nottingham's
Achievement.**

companies, even opposing their applications ; and the later phase when both parties, realising the nature of the hygienic, economic, industrial, and political problems which were maturing, and the futility of conflict, joined forces in the effort to achieve success."¹

The really determined attempt to improve the Trent dates from 1914 when it was proposed to spend £150,000 on the work, towards which the Development Commissioners promised to contribute £50,000 from national funds provided in connection with the Development Act of 1909, but the European War put an end to the scheme for the time being. The project was taken up again in 1921, and it was used partly as a means of finding employment for the relief of distress. The ultimate cost, owing to the changed post-war conditions was somewhere about half a million. Weirs have been raised, locks increased in size, and the river dredged. The capacity of the river has been increased to take 100 ton barges, but the locks have been provided on a bigger scale, so that if success results it will be possible by raising the weirs to accommodate still larger barges. At present the locks will take a tug and three barges each of 100 tons, so that the capacity of the river has been very greatly increased. The completion of the work is so recent (during 1926) that as yet there is no evidence as to its success or failure, but if in addition to improving the river adequate steps are taken to organise transport facilities and to provide for terminal services, in short, if in future traffic on the Trent is dealt with in the way a railway company would handle it, there is every reason to anticipate that the undertaking will be successful, and that the enterprise of the people of Nottingham will be amply rewarded.

The possibility of improving waterways to the coast has received considerable attention in Birmingham, where a Committee of the City Council, together with certain non-council co-opted members representative of business interests such as the Chamber of Commerce, has had the matter in hand. The problem which Birmingham has had to face, however, is not a simple one like that which Nottingham has dealt with. Birmingham is not blessed with the advantage (from the water transport point of view, if no other) of standing on the banks of an important river, and, in addition, the city has the

**Birmingham
to the Sea.**

¹ Mr. W. A. Appleton, C.B.E. in the Souvenir pamphlet, *Nottingham's Highway to the Sea*.

distinct disadvantage (again from the water transport point of view) of standing something more than 400 ft. above sea level. These two facts raise twin problems of "locking" and water supply, which are extremely difficult to solve. The ascent to and descent from a city at such a level mean a considerable number of locks down which, of course, water must gravitate as the locks are used, and, in the absence of an adequate natural supply of water such as that furnished by a river, it would all have to be pumped back again to the top level. For these reasons the cost of providing an adequate artificial waterway is bound to be immensely greater than that of improving such a river as the Trent.

There is another aspect of the problem, however. If it should be decided that an improved waterway outlet to the sea is now indispensable to the Midlands, what direction should the waterway take? Should it go to the Severn in the neighbourhood of Worcester and thence to Bristol, to the Mersey and Liverpool, or to the Thames at London? All these ports serve Birmingham, but in different ways. Bristol, for instance, is the channel by which Birmingham imports more than she exports. Whichever direction might be adopted, no doubt there would be plenty of people who would criticise the decision as wrong, and would favour either or both of the other two ways not adopted. And, of course, the people interested in the ports in the directions not adopted would make strenuous efforts to retain the Midland traffic they have had in the past. Not one of the cities, London, Liverpool, and Bristol, would take a considerable loss of traffic "lying down," as the modern colloquialism expresses it. They cannot afford to do so.

So far Birmingham's experience has not been encouraging. At the outset the improvement of the waterway to Bristol was regarded with most favour, probably because of the relative smallness of the cost which the scheme would entail. And in those days the Minister of Transport in the then Labour Government went so far as to promise that, if the city decided to acquire the canals to the Severn and improve that route, the Government would give financial assistance. Before anything definite was done, however, representations were made that the route likely to be most useful was that from Birmingham to the Mersey. In this

**In which
Direction?**

**Birmingham's
Discouraging
Experience.**

direction lie a considerable population and a number of important towns and cities, and it was apparent that at least one authority—Stoke-on-Trent—would warmly support a scheme to improve the waterways to the Mersey. A conference of authorities interested in that route was convened, at which it was definitely resolved that every effort should be made to improve it. From this time the Bristol idea was more or less shelved, and attention was devoted to the problem of improving the north-western route. Representatives of the Committee again went to the Ministry of Transport to ascertain the attitude of the Government (no longer a Labour one) ; whether financial assistance would be forthcoming ; whether facilities would be given for the promotion of a Bill and its passage through both Houses ; and whether the Government would assist the city in overcoming the objections of the railway companies interested.

To each of these questions the answer was a definite negative. The Government would promise neither money nor facilities, but
No Help from Government. intimated that the local authorities must take the initiative and get an Act of Parliament. When they had got this and were in a position to put the whole scheme before the Government, the question of financial assistance would be considered. This was very discouraging to Birmingham and the other authorities. It put on them all the responsibility, arduous work, and expense of promoting a Bill, and gave them no assurance of the least help. Naturally it caused them to hesitate.

In the meantime other, and perhaps more important, conditions had been developing unfavourably. The financial position of local
No Money for Waterways. authorities owing to bad trade, the demands of Housing Schemes, and such like causes, was becoming steadily worse. Most of them were working strenuously to secure economies which would stay the upward movement of their rates, which almost invariably had already attained serious proportions. None of them had any money to spare for waterways development, and at a conference they said so. That for the time being seems to be the end of the Birmingham to the Mersey scheme. It may not be so, of course, because the final decision has not yet been taken ; but Birmingham, alone and unassisted by other authorities, is not likely to undertake a scheme

the minimum known cost of which is at least ten millions, and which ultimately might cost many millions more. And so Birmingham has turned again to consideration of the possibility of improving the way to the Severn at a cost which it is estimated and hoped will come within two millions. This scheme is not being rushed, however. Steps are being taken to place the details before all the large representative trade organisations in the city, and to ascertain from them whether they want it, and whether, if they had it, it would be really useful. From time to time there have been some adverse criticisms, and suggestions that the scheme is futile. If the business interests support the scheme and bring evidence that it is likely to be beneficial to the trade of the city, then more will be heard of it. Sooner or later, possibly, it will be carried out ; later rather than sooner, in view of the financial stringency from which the city is suffering in common with all other local authorities. If the business interests do not want the scheme, it may even now be regarded as dead.

From all this it will be realised how extremely difficult it is to get anything done to improve the inland waterways of the country. The Royal Commission was favourable to a thorough reconstruction of a considerable portion of them. At regular intervals bodies like the Chambers of Commerce have asserted the importance of carrying out the scheme, and one might be inclined to think that public opinion was definitely in its favour, but such are the straitened times we live in that no authority, either national or local, can find the money to do anything important.

PART III

SHIPPING AND OCEAN TRANSPORT

CHAPTER I

EARLY NAVIGATION AND THE COMMENCEMENT OF MODERN INTERNATIONAL TRANSPORT SERVICES

THE preceding sections of this book have dealt mainly with questions of land transport, or at least the carriage of goods between districts or countries in fairly close proximity to each other.

General. But there is a greater question, so far as distance to be traversed is concerned. Discovery and invention have had the effect of widening the area of markets to so remarkable a degree that the beginning of the twentieth century finds the extent of the market only limited by the area of the habitable globe, in other words, there is in a very real sense to-day a world market, and the possibility of world trading to which previous human history can furnish no parallel. The secret of this greatly extended trading area is bound up first of all with the improvement of the ship, the vehicle of ocean transport, and, secondly, with a series of inventions which have rendered mankind independent of natural forces, in that man himself has devised artificial methods of ship propulsion which have entirely revolutionised the conditions of international trading. The revolution of shipping business, the ship and her management, the science of navigation and the opening up of trade routes afford one of the most interesting stories in the annals of human activity. Nor will it be inexpedient to devote a few pages here to outlining the main points in this story.

It is unnecessary to do more than refer to the shipping and international trade of the ancient world or even of mediaeval times. As has already been noted, primitive man very early realised the advantages of a water route and devised craft capable of serving him for various purposes on river, lake, and sea.

From these primitive craft evolved a variety of water-borne

vessels ; and it is interesting to know that as time went on, in widely separate parts of the globe, boats of various dimensions but of remarkably similar design and construction were produced. And by the beginning of the sixteenth century a sailing ship was available in European waters, which was capable of going anywhere and doing anything. It might be difficult to give a decided opinion as to the original type of this ship. Phoenician traders had visited Western Europe in almost pre-historic days, and it was the tin mines of Cornwall that first brought Britain within the ken of civilisation. Ships that could sail from the Levant to Cornwall, even though the greater part of the voyage was within sight of land, must have been strong capable craft. Nor is it unduly exercising the imagination to surmise that those vessels were the direct progenitors of the ships by means of which Venice consolidated her power at the head of the Adriatic, and organised regular trading cycles which brought Western Europe, the East, and the great stretch of intermediate lands into trading relations.

Evolution of Shipping.

The modern ship, then, owes her origin to the Mediterranean, for the Viking type of ship, which had served the English not only in the time of Alfred, but down to Plantagenet days, was superseded for trading purposes by ships of the Mediterranean model, when the Crusading energies of Richard I brought Englishmen into close touch with this more businesslike form of ship. Henceforward English shipbuilders and designers produced for the foreign trade a ship which in her principal dimensions and model resembled the Venetian vessel. Gradually there evolved the apple-bowed ship, with full round lines, with good cargo-carrying capacity, and capable of facing heavier weather than any previous type of ship known in Western Europe. Previous to the Crusaders, the Englishman, though innately a sailor, had confined his energies mainly to the North Sea and coasting trades. The increasing dominion of the English King on the Continent had attracted English ships as far south as Bordeaux, but it was the carrying of troops and stores to the Levant that gave the initial impetus to the movement that resulted in making the Englishman first of all a world trader, and in course of centuries the world trader.

Origin of Modern Ship.

In *Hakluyt's Voyages* there is an account of an English ship

touching at the island of Madeira in the middle of the fourteenth century. This may be apocryphal, but it contains a germ of truth—

**Early English
Adventure.**

English shipping had ceased to be limited in its sphere of action and was preparing to compete on every sea for the trade which began to show

unmistakable signs of an undreamed of development.

The conditions of living for the great mass of the people were remarkably different five hundred years ago. The fruits and

**Need for Spices
promotes Trade.**

vegetables grown in England were vastly different from those with which we are familiar, and the food-stuffs on which the people depended varied according

to the season of the year in a way of which we can barely form a conception. It was with great difficulty that live-stock could be kept alive during severe winters. Indeed, it was the custom to kill a large number of animals at the approach of winter and preserve their flesh for consumption during the long winter months by means of salting. Scurvy and similar diseases were prevalent, and the use of condiments and spices was absolutely necessary to health. Thus trading relations with countries where these commodities were produced was rather more than a business consideration; it was a matter of life and health.

For some centuries the Venetians were the link between East and West. They brought the spices as well as luxuries of the East,

**Venetians the
World Traders.**

and exchanged them against the wool, cloth and metals of Western Europe, and by means of well organised trade routes, they maintained a system of

world trading which was highly profitable to themselves and of the greatest moment to a large and developing part of Europe and Asia.

Unlooked for events, however, at first transferred and then rudely broke down the Venetian trading system. The Turk appeared

**Turks Control
Supplies.**

upon the scene, and by the conquest of Constantinople in the year 1453 erected a bar to trading relations between East and West, which meant

that either the Turk could tax at will commodities which were necessities of life to the population of Western Europe, or that he could cut off supplies altogether.

This situation unfolded itself just at the moment when certain virile people were beginning to feel the spur of a new and highly elevating force, namely, nationality. Europe had in theory been

one great community with the Emperor at the head of things secular, and the Pope at the head of things spiritual. There had been signs of a restiveness which augured badly for the permanence of a theoretically perfect system of human government. The English had for centuries been an uncertain quantity in European affairs. The Norman Conquest and its issue increased this uncertainty. And to make a long story short, with the birth of that great movement known as the Renaissance, European society, if that term be admissible, from having been divided horizontally became subject to a vertical division, as the feeling of nationality asserted itself.

The Englishman, the Frenchman, the Dutchman and the Spaniard, each found himself pricked in his tenderest spot—his pride of race and his physical well-being—by the success of the Turk.

It was not to be expected that the barring of trade routes would be accepted without either a protest or an attempt at finding other routes along which trade might pass free and unchallenged. Political history tells how Europe made her protest to the Turk. Commercial history more satisfactorily shows how the intrepid trader and mariner found a way where diplomacy and force failed. The Venetians lost their supremacy in commerce partly owing to their quarrel with the Turk, mainly through European jealousy, and their own moral decay. Thus the interest of the story shifts from the Mediterranean, and we must look to England, the Netherlands, and the Peninsula for the real answer to Turkish aggression.

The problem before the trading community was to discover a new route to India. The Englishman, the Spaniard, and the Portuguese each conceived a theory and proceeded to work it out. The patient Dutchman was content to rest on his oars for a space, and meantime quietly prepare himself for the commercial struggle that must result.

First among Portuguese navigators comes Prince Henry, a Portuguese, yes, but with sufficient English blood in his veins to give him that dogged perseverance tempered by cautious imagination which led him to exert his energies in the right direction. He and a succeeding band of intrepid sailors coasted down the west side of the African Continent, and it was a Portuguese, Vasco da Gama, who, first of

Rise of Nationality.

Trade Hindrance through Turkish Conquest.

A New Route to India Required.

Portuguese Navigators.

navigators, rounded the Cape of Good Hope, and running up the east coast, heard of the possibility of reaching India by trusting to the monsoon. Such a possibility was not to be lightly disregarded ; da Gama engaged an Arab pilot, and boldly shaped his course across the unknown ocean. True courage usually meets with its reward, nor was the rule broken in this instance, for on 20th May, 1498, da Gama and his little squadron arrived safely at Calicut. The great problem had received one solution. There was a long sea route to the Indies, and henceforward European traders might voyage to the Far East unhampered by the Turk or by any force except their own commercial jealousy.

The Portuguese, however, were not singular in seeking a new route to India. A great Italian sailor had been studying the question, and influenced somewhat by speculation as to the formation of the world in some scientific books, but
Columbus and America. mainly urged on by his own genius, he determined

to find India by sailing westward. His own countrymen were unwilling to help in any such foolhardy enterprise. Henry VII of England refused to lend ships and money ; a refusal he lived to regret. At length, however, after seven years of disappointment, the Spanish Sovereigns, Ferdinand and Isabella, furnished the necessary vessels and equipment. Columbus sailed on 3rd August, 1492, in a small ship attended by two caravels containing a force of 120 men. After many hardships he landed at one of the West Indian islands and the outward voyage terminated at Cuba and Hayti. It was not until March, 1493, that Columbus arrived back at Patos, and, then, with but the wreck of his expedition, in one of the caravels—the other vessels having been lost. Voyaging in those days was no arm-chair occupation.

Columbus at first thought he had reached the neighbourhood of India, little dreaming that it was a New World that had been brought within the sphere of European domination.

Navigators from the Peninsula had thus discovered the sea route to India, and opened up unexpected possibilities across the Atlantic.

Englishmen also had their dreams, but their realisation entailed
English Endeavour. voyaging northward. To these mariners the success of Portugal, on finding a south-east passage to India, suggested the possibility of there being either a north-east or a north-west passage, which would serve

equally well the needs of commerce and be the English route. It is unnecessary to give here the details of the long and interesting story. Suffice it to say that Sir Richard Chancellor, in the reign of Queen Mary, going North and East, failed, indeed, to reach India, but carried his ships into the White Sea, and successfully opened up diplomatic and commercial relations with Russia, which had the greatest importance commercially at the moment. Russian trade with Western Europe was thereby freed from the Hanse monopoly, and between England and Russia a growing trade resulted.

Sailing in the other direction, John Cabot and his son, Sebastian, in the reign of Henry VII, had attempted to find the North West

The Cabots. Passage. Again, there was failure as to the main object of the voyage, but a greater success was

achieved in that this and subsequent voyages made known the coast line of North America, and thus laid the foundation for Anglo-Saxon dominion there, which has become one of the great factors for good in the modern world.

The aggression of the Turk and the stirring of the modern spirit had, indeed, achieved much. Long ocean voyages became practical business, and large areas of the globe hitherto unknown, and whose very existence was unsuspected, were brought within the pale of colonisation, trade and civilisation.

Rise of the Dutch.

During the latter half of the sixteenth century and all through the seventeenth century, these new routes and these new countries were being further studied and exploited by the interested countries. The Dutch came upon the scene, and on the failure of Spain and Portugal, took up the premier position as world traders. Englishmen at first enjoyed the danger and incident of distant voyaging. The policy of Spain and Portugal tempted many an English sailor to evil courses, prematurely degenerating into piracy, and the Spanish Main gained an unenviable reputation for all that is vicious and bloodthirsty. Happily, however, the commercial instinct of the nation was sound and in due time asserted itself. Cromwell initiated a policy which enabled England to gain the commercial supremacy which had seemed likely to remain with the Dutch, and thenceforward Englishmen have generally been the first on every navigable ocean.

The great belt of continents east and west had been discovered, but there were several surmises as to the existence of a great

southern continent. Dutch navigators went south from their East Indian possessions and part of the Australian coast became

**Captain Cook
and Australasia.**

known. The completion of the work of discovery was effected by Captain Cook between the years 1768 and 1779. Thenceforward, Australasia, including the main continent of Australia, the islands of Tasmania and New Zealand, and many groups of islands, containing much of interest to both the anthropologist and the trader, have been known to civilisation ; and the loss by England of some of her fairest possessions in North America led her to develop the new land to the far south, the result being the Commonwealth of Australia and the Dominion of New Zealand, so familiar to voyagers to-day.

From the time of Captain Cook, practically the whole trading area of the world has been known, and a great work of trade development

**Trade
Development.**

has been proceeding. New routes, new possibilities, new forms of ships and new methods of navigation have completely changed ocean voyaging as practised by Columbus and Raleigh, Davis, Cabot, or Chancellor.

CHAPTER II

THE PERFECTING OF THE VEHICLE OF OCEAN TRANSPORT

WHEN the nineteenth century dawned, English ocean-going shipping consisted mainly of two types of ship, the Indiaman and the Free Trader. The former was the great link between England and the Far East, and carried on a trade which was more than ordinarily lucrative, owing partly to the monopoly conferred by the Charter of the East India Company, but it must not be forgotten that it was owing also to the very great risks that attended distant voyaging a century ago.

**The Indiaman
and the
Free Trader.**

**East India
Company.**

Dating from the days of Queen Elizabeth the East India Company had, through many vicissitudes and after disputing Portuguese, Dutch and French pretensions to the paramount trading position in the Far East, become a great almost a national, institution. This favoured Company (favoured because its Charter, granted by the English Government, assured it of the monopoly in the Indian trade) had become well-nigh a sovereign body. Indeed, it exercised many of the functions of sovereignty, without being encumbered with responsibilities. From the headquarters, in Leadenhall Street, London, an Empire was governed by a Board of Directors. To understand the situation it is necessary to remember that there was no submarine cable, and no steamship communication between England and India. The route along which all communication must pass was the long sea voyage via the Cape of Good Hope and many weeks or months must elapse before the home management could either direct or check the action of the managers on the spot. The position was both novel and anomalous in the world's history, and yet on the whole it worked well. There were undoubtedly abuses, but the native traders of the Far East had learned by long and bitter experience that the Englishman, with all his faults, was to be preferred to any competitor in trading relations. The genius for self-government, colonisation, and the conducting of a great and developing trade, untrammelled by regular Government supervision enabled the Englishman more than to

hold his own in those distant seas. And the outcome was that a trading company laid the foundations of an English Empire of the East, and governed many millions of human beings in a way which would merit the envy of either the ancient or the modern world.

It is, however, the trading energies of this great Company that are interesting in this connection. There was, for those days, a

The Company's Ships. great exchange of goods carried on between Europe and the Far East, the principal part being in the

hands of the English East India Company. For purposes of transport a fleet of fine ships had come into being ; indeed, the East India Company's ships were the finest specimens of naval architecture of their day. The regularity of their services, the high standard of efficiency of their officers and crews, and the mail and passenger facilities thus organised, entitle us to look upon these ships as the precursors of the modern liner.

But in addition to this Far Eastern trade, England was carrying on a very great commerce with other parts of the world. For this

The Free Trade Type of Ship. more miscellaneous trade another type of ship was employed, smaller, and more cheaply built, more economical to handle—in a word, a commercial ship

of comparatively great economic value. This ship is typified by the West Indian Free Trader—a vessel of small tonnage as compared with the Indiaman ; a mere cockleshell as compared with trading vessels of to-day. This Free Trader of a century ago might measure from 300 to 700 tons, whilst the Indiaman's measurement would vary from 1,000 to 1,500 tons. The latter was frigate-built, carried a large crew, and was fully armed. She was frequently a fast sailer, and, owing to the high freights of those days, she made large profits in spite of extravagant management and comparatively small carrying capacity. The Free Trader, on the other hand, had to meet the competition of all comers in certain trades, and in order to do so, had to be run economically and carry every ounce of cargo possible. Keen competition for ocean transport had led to the evolution of a very useful ship, which, although small, could accomplish a great amount of work at small expense. It is of great interest to notice these points, for it was from these beginnings, and from the experience of management and organisation of these two types of ship, that modern English shipping and its management have evolved.

During the troublous times on the Continent, English shipping had enjoyed almost a monopoly of world trading. A competitor, however, little thought of at first, but destined to become formidable, appeared upon the scene.

**English Monopoly
of World
Trading.**

The Eastern areas of North America, during the days of the wooden sailing ship, contained unfailing supplies of all the materials then required both for shipbuilding and ship equipment. It is true that the trees were mainly of soft wood, but such material was adaptable, and experience proved that ships built of soft wood, though not so long-lived as those constructed on the English principle, of oak or teak, were very efficient vessels for cargo-carrying purposes. Moreover, English builders and designers were conservative. They jealously adhered to the bluff bow and heavy stern, and proportions of beam to length, which might ensure safety, but were ill-calculated to produce speed in sailing. The American builders, untrammelled by tradition, evolved a new model and produced a ship that could sail at almost twice the speed of the English built ship. Then as now, both traders and travellers considered speed, for, though in perhaps a somewhat less degree than to-day, time meant money. Hence, American shipping began to advance in importance and to find its way into all trades, until, by the middle of the century, British shipping was on the defensive in almost every trade, and American tonnage assumed dimensions which very seriously threatened the old British supremacy. From the economic point of view the situation was fairly simple. The British ship was strong and safe, she could deliver her cargo in sound condition, but she was slow. The American ship, on the other hand, was fast, but was weak, and was apt to land cargo in a damaged condition. It was a question of speed against safety—or from the English point of view, the necessity to cut oneself adrift from old prejudices, improve the model and dimensions of the ship, and so gain the double advantage of speed and safety. To the credit of the English shipowner, the latter policy was adopted, and beginning with the building of the *Challenger* by Mr. Richard Green, of London, in the year 1850, a type of ship was produced, the equal of which for speed, economy of working, and strength of construction, has never been equalled. The British clipper ship which aroused the

attention of the trading world, first in the China tea trade, then in the Australasian and West Coast trades, become a great factor in developing world commerce, and bringing within the reach of all classes of the community, commodities which ships of the Indiaman type had supplied to the wealthy alone.

It would not be fair to give the impression that American shipping competition was overcome solely by the production of the British clipper. That event undoubtedly had a very great effect. But there were other factors at work.

Shipping Competition.

Wood, either hard or soft, is of but limited application to shipbuilding. After a length of 300 ft. had been attained, it was found that wood failed to give the necessary stability for ocean voyaging. Attempts had been made to build water-borne craft of metal. The success of Cort's rolling mill opened up great possibilities, and it was found that iron frames sheathed with iron plates, would produce a vessel that not only would float, but had a greater carrying capacity and strength than a wooden craft of the same dimensions. At first, however, and for some decades, there was a prejudice against ships constructed of iron. The possibility of the compass being dangerously deflected appeared to be the cause of the loss of the *Tayleur*, a large iron ship, on Lambay Island in the year 1854. Sir William Thompson, by his inventions in connection with the compass, obviated this danger, and the experience that iron ships were stronger, of greater capacity, and could be built up to hitherto unthought of dimensions, sealed the doom of the wooden ship. Some shipowners obstinately kept to the old-fashioned vessel, and an interesting attempt was made to combine the two materials by the construction of composite ships, *i.e.*, ships having iron frames and wood planking. But the test of time completely proved the superiority of the iron ship, for practically all ocean-going purposes.

The adoption of iron for shipbuilding gave British builders a very great advantage. Great Britain was not only the chief iron-producing country, but had a large labour force

Iron Adopted for Shipbuilding.

skilled in iron construction work. Thus, until Germany developed her iron industry and then turned her attention to shipbuilding, and the United States, after concentrating attention on internal development for nearly forty years, once again entered the lists, both as a shipbuilder

and as an ocean carrier, British builders and owners enjoyed a great opportunity, an opportunity they were by no means slow to improve.

Experience of iron for shipbuilding had to be gained. The first iron ships were far too heavily built, but as time passed, experience and knowledge took the place of rule of thumb, and a remarkably efficient ship resulted.

Steel Ships.

Not an ounce of unnecessary material was to be found in her construction and equipment. Gradually iron gave way to steel, it having been proved that soft steel is more adaptable and suitable for shipbuilding than wrought iron. Again, a reduction in the weight of metal resulted, and there was a corresponding gain in carrying capacity. Nor was the use of iron or steel limited to the hull of the ship—cables, masts, and even rigging are now of steel, steel wire rope being stronger, lighter and handier than hemp or manila. In every particular the sailing ship was the subject of improvement, until about the year 1890 there had been evolved as perfect a vehicle for ocean transport purposes, propelled by canvas, as it is possible to imagine.

The moment of perfection marks the moment when supersession by steam commenced. From the middle of the 'nineties of last century the importance of the sailing ship began seriously to decrease. Lloyds' Register shows increased efficiency and tonnage of steamers, accompanied by diminished numbers of sailing ships. In the 1926 reports there are particulars of only four deep water sailing ships belonging to British owners. One of these is the famous *Cutty Sark* now lying at Falmouth, restored to something of her youthful appearance—a thing of beauty. The others are for a time spared to carry on trade, and it may be interesting to know that one of them—the *Garthpool*—a four-masted barque arrived in Liverpool on 14th September, 1926, and caused somewhat of a commotion on the Mersey, as her captain refusing the offer of a tug, sailed his ship up the river and anchored off New Brighton without assistance. There was a full account of the ship's appearance and her voyage published in the press,¹ and this contains several items of interest. The ship was handled in first-class style, and looked a picture of smartness. The round voyage extended over 25 months, beginning at Dunkirk on 27th August,

¹ *Journal of Commerce*, 15th Sept., 1926.

1924, sailing to Campbeltown, N.B., in ballast, which took 40 days. There she loaded 1,200 standards of white deals, and sailed on 5th November for Adelaide and Melbourne. The voyage to Adelaide took 101 days. Eight days later she left for Melbourne, the time taken for the run being 9 days. She was laid up in Melbourne for nearly five months, and then obtained a cargo of grain at Geelong for Callao; that voyage took 84 days. From Callao to Sydney, a distance of over 7,000 miles, she completed in 48 days, the best day's run being 290 miles. This was rather a record run. At Sydney she shipped 56,000 bags of grain weighing 4,700 tons, and sailed to Falmouth for orders. Coming via the Horn, she arrived in Falmouth on 27th June—144 days from Sydney. Orders at Falmouth resulted in the ship proceeding to Birkenhead.

These particulars may well find a place in a history of transport, seeing that before many years are over this sort of voyaging will have completely ceased.

Hand in hand with the improvement of the ship, science, invention and discovery had been creating a science of navigation served by instruments of a precision almost superhuman.

**Advance of
Science of
Navigation.**

Every ocean, sea, and river along which the world commerce passes has been mapped, charted, buoyed where necessary, and studied to the extent that practically every hydrographical and meteorological phenomenon is known, and the skilled navigator has knowledge of every toward or untoward contingency. For nearly two centuries the theory of trade winds has been known, and routes have been standardised in the published *Sailing Directions*. Work commenced by officers of the East India Company was continued by James Horsburgh and Lieutenant Maury, and is now kept up to date by the British Meteorological office and the American Weather Bureau. Some even of the most out-of-the-way coasts have been lighted, and the lighthouse system has been brought up to an advanced stage of perfection. Docks, harbours, warehouses, quays have been provided for the safety of ship and cargo; and in a word shipping business appeared, about half a century ago, to have evolved a system of organisation by means of which the great quantities of raw materials and manufactured goods, which distant parts of the world have produced for purposes of trade, could be shipped in sailing vessels, which could speedily and economically effect the

work of transport. The sailing ship apparently had been improved to the point at which it was safe to foretell that she would be a permanent adjunct to the commerce of the world. But in things human, perfection is never really attained ; it appears to be on the point of attainment, and then new possibilities arise and the old passes away. So it was with the sailing ship. An exceedingly economical, capable, and at the same time beautiful type of ship had been produced ; but within a few years it was realised by far-seeing commercial men that the sailing ship was doomed to disappear. That she is still able to trade on one or two routes is a remarkable testimony to her efficiency, but, sad though it may be, for some years past it has been well known that the sailing ship cannot compete with the modern steamer. The steamer, too, has been another great factor in giving to British shipping long years of supremacy. The foreigner could have bought our sailing ships, and operated them in competition with us ; but to operate steamers on a large scale required many facilities which we organised when no one else was ready to do so. These facilities and our coal supply, our engineering skill, together with the business ability of our shipowners have been a heavy handicap to foreign rivals, and have taken long years of patient effort to wear down.

As at the beginning of the nineteenth century our shipping could be divided roughly into two great classes—the Indiaman and the

Special Types of Ships.

Free Trader—so to-day there are two main types of ocean-going vessels—the liner and the cargo steamer. But these two types can be subdivided into numerous classes, for few things are more interesting in the modern development of shipping than the growth of special types of vessels for special trades.

The passenger and mail liners have been subject to this evolution to almost as great a degree as the cargo steamer. The *greyhounds* of

The Liner.

the Atlantic differ in many remarkable ways from the Far Eastern and South African mail steamers. This is due partly to differences in the trades, but mainly to a variety of conditions, which could hardly have been foreseen by even the most far-seeing shipping managers. Until quite recently the tonnage of the Indian or Australian liner was limited by the dimensions of the Suez Canal. For, as originally opened, this waterway had a depth of only 24 ft. During the first twenty

years of its existence, the depth was only increased by 1 ft. Nor was it until the year 1902 that it attained a depth of 26 ft. ; four years later 27 ft. ; and with further deepening operations, it attained 28 ft. in 1908, and it has since been still further increased, the policy of 1921 being a canal with a depth of 13 metres (42 ft. 8 in). By the end of the year 1925 over 60 kilometres out of a total length of 160 kilometres had been dredged to this depth.¹

With increasing depth of water the Canal Company have increased the width to 240 ft. at the surface, but even to-day the dimensions of shipping using this route are somewhat limited as compared with the ships crossing the Atlantic.

Ports, docks and rivers, too, have their effect on the type and measurement of a vessel engaged in a given trade. For the North Atlantic trade, the leviathans of from 50,000 to 60,000 tons now operating, are not the maximum tonnage that could make the voyage between the Mersey and New York. But the fact that the Cunard liners of under 40,000 tons cannot, with safety, call at Queenstown for the mails, and that the larger vessels of the Hamburg-American Line cannot complete their coaling and equipment at Hamburg, suggests that, until some of the more important harbours and rivers are deepened and improved in many other respects, the limit of size has almost been reached. However, an announcement has just been made to the effect that the White Star Line has got out plans for a new steamer of bigger dimensions than any so far crossing the Atlantic. The *Oceanic*, as she will probably be named, will measure 1,000 ft. in length, and have a speed of about 25 knots. She will take three and a half years to build. Thus by the year 1930, if this scheme goes through, there will be another greyhound capable of crossing from Europe to America in four and a half days.

Thus the Atlantic trade continues to be the pioneer in ships of great tonnage. It is true that the *Great Eastern* was designed for the Far Eastern trade, but her early voyages were made across the Atlantic, and she was never used as a passenger or cargo ship in Eastern waters.

Practically the Far Eastern routes were operated by comparatively small ships until the opening years of this century. Thirty years ago 6,000 or 7,000 tons was the size of the largest mail steamers to

¹ Cf. Rapport, 1926, p. 10.

Australia. The *Ophir* of the Orient line, in which King George, when Prince of Wales, visited Australia, was only 6,814 tons register, and the *Himalaya*, built for the Peninsular and Oriental Company, twelve months after the *Ophir*, was only about 80 tons larger. Owing to the increased dimensions of the Suez Canal, the more recent additions to the P. & O. Company's fleet—the *Mooltan* and the *Maloja*—measure 20,840 tons, showing a very considerable increase in size. Vessels trading to Australasia by the Cape route, attained a more impressive tonnage somewhat earlier. The *Ceramic*, of the White Star Line, measures no less than 18,500 tons; and the tonnage of the steamers of the Aberdeen Line has been increased during the last few years from vessels like the *Marathon* of 8,000 tons, built in 1904, first of all in 1911, to 11,200 tons, the *Demosthenes*, and then in 1914, to 15,000 tons, the *Euripides*. But these are rather cargo liners than mail passenger ships.

With the growth of tonnage it has been possible entirely to revolutionise the passenger accommodation on board ship. The early steamer, following the tradition of the sailing ship, was built with a full poop, so that the passengers were carried in what was really the most uncomfortable part of the ship, right over the propeller, where there was a maximum of vibration and discomfort.

**Revolution of
Passenger
Accommodation.**

The pioneer in improvements in passenger service was the late Mr. T. H. Ismay, of the White Star Line. He boldly broke away from all precedents, and placed the passenger accommodation amidships, where there was the minimum of motion, vibration and discomfort.

**Mr. Ismay
as a Pioneer.**

His lead was quickly followed, and from the early 'seventies there was a growing competition, notably among the North Atlantic Companies, to provide their passengers with accommodation containing comforts and luxuries which in smaller vessels could not have been attempted. It is not an exaggeration to say that the Atlantic liners of to-day contain sleeping, refreshment, recreation, and even bathing accommodation equal to anything that can be enjoyed within most up-to-date hotels on shore.

As the *Aquitania*, which left the Clyde to take her place on the Liverpool-New York service in May, 1914, and after doing good war service was thoroughly reconditioned and refitted, is the last word in mail and passenger shipping, a short description of

the vessel and some novelties in her equipment will sum up the progress made in this direction. This ship was launched on 21st April, 1913, from the yard of John Brown & Co. at Clydebank. Her principal dimensions are : Length, 901 ft. ; breadth, 97 ft. ; depth to boat deck, 92 ft. 6 in. ; gross measurement, 47,000 tons ; speed from 23 to 24 knots. Her first trip across the Atlantic (June, 1914) was accomplished in five days, seventeen hours : the best day's run being 602 knots. The average speed over the whole distance of 3,181 miles was 23·1 knots. She accommodates 3,250 passengers, and a crew numbering about 1,000. For the safety of this large number of people the most vulnerable section of the ship has been specially constructed with two shells—a ship within a ship—both the inner and the outer shells being absolutely watertight. The space between the two shells has an average width of no less than 15 ft. ; whilst at short intervals there are bulkheads dividing this *safety* space into small compartments. Thus, in the case of collision either with another vessel or with an iceberg, causing a fracture of the outer plating, only a comparatively small section of the ship would be flooded. In addition to the double skin, the vessel has no fewer than sixteen bulkheads, extending fully across the beam of the ship. These are also absolutely watertight, separating the ship into seventeen sections, each of which is capable of floating by itself. Nor is this the whole provision made against the danger of being sunk in mid-ocean, for each of the decks is watertight. The vessel is thus as unsinkable as the art of man can make her, but in case the worst should happen, sufficient life-boats (two of which are fitted with motor engines and wireless telegraphy) are provided to accommodate every member of the ship's company. The passenger accommodation is replete with every convenience and luxury : verandah cafés, drawing rooms, lounges, gymnasias, a swimming bath, even a theatre ; whilst some of the suites of rooms have private verandahs attached. For a crossing of five days, luxuries like these seem superfluous, but they are in demand by the over-wealthy. The machinery for driving this large vessel at an average speed of over 23 knots consists of a triple-compound system of turbines on four shafts, attaining 60,000 horse-power, and there are twenty-one boilers, working at a pressure of 195 pounds to the square inch.

For a time, passenger services to Africa, India, and Australasia lagged behind those on the Atlantic so far as gorgeousness of decoration and spaciousness is concerned, but with the larger ships now employed on these routes, there has been a growing luxury in equipment. A recent innovation, however, is worthy of note. The White Star Company placed a number of steamers of comparatively large tonnage on the Australasian route via the Cape. The first of these steamers—the *Ceramic*—measures 18,500 tons, as has already been mentioned. The novelty of this service is that there is a revolt against luxury of decoration and display in the passenger quarters. Comforts and necessities are attended to, and there are even two open-air swimming-baths provided, but the extreme of luxury has been avoided, doubtless out of compliment to the more democratic type of passenger travelling to and from Australia and New Zealand. The high-water mark of luxury is reached in vessels like the *Aquitania*, but for the solid comfort one requires when making a sea voyage, experience will probably decide in favour of a less showily fitted, but equally comfortable ship.

From the paddle steamers which carried passengers and mails during the 'fifties to the *Aquitania* on the North Atlantic and the *Balmoral Castle* on the South African route, or the *Maloja* or *Ceramic* carrying passengers to the Far East, there has been a very great advance made in tonnage, in comfort, in economy, and in efficiency, nor would it be safe to think that the next half-century will not witness further progress in these directions, possibly equally striking.

If the mail steamer has been improved during the past half-century, it can be said that the cargo steamer has been created. Fifty years ago the ocean carrying trade of the world was the unchallenged sphere of the sailing ship. It was thought that steamers might be necessary for the carriage of mails and passengers, but they would inevitably taint cargo, even though they could be so constructed as to compete economically for freight service. Delicate commodities like tea and fruit would, it was imagined, have their flavour spoilt. This prejudice, however, was exploded in the year 1863, when a steamer—

**The Passenger
Service to Africa
and the East.**

**Probabilities
of Further
Development.**

**Creation of
Cargo Steamer.**

the *Robert Lowe*—brought a cargo of tea from Hankow to London, and it was found that the tea had suffered no injury. This within ten years sounded the death knell of the celebrated China tea-clippers, which were gradually taken off the China service and were utilised in opening up new trades and extending those already established in various parts of the world—notably with Australasia and the west coast of South America. From that time onward there has been an increasing progress in the design of ship and engine, until the present day cargo steamer is an illustration of the maximum of economic capacity, combined with the minimum of cost, weight, and working expense. The effect of the great evolution that has been going on in the perfection of the cargo vessel can be summed up in the sentence that the sailing ship of a century ago could with difficulty transport commodities in retail quantities to gratify the luxury and ostentation of the wealthy, whilst to-day, thanks mainly to economical transport facilities, the majority of the commodities that were luxuries, are now to be found in the households of the poorest, for they have become the food or clothing of the masses.

An average cargo steamer of to-day measures about 8,000 tons gross, 5,000 tons net, has a length of about 480 ft., a beam of 63 ft.,

and a depth of 31 ft., carrying a crew of from forty

**The Cargo
Steamer of
To-day.**

to forty-five hands all told. Such a vessel, whilst the geared turbine and internal combustion engines are still on their trial,¹ would be fitted with triple

or quadruple expansion engines, with boilers working at about 220 pounds pressure to the square inch. The amount of coal consumed would average from 65 to 70 tons a day, and the vessel would steam about $4\frac{1}{2}$ knots for each ton of coal consumed on a long voyage. The speed of the modern cargo steamer was considerably increased during the five years prior to the war. Eight to 11 knots used to be the usual speed; the cargo boat of to-day will average from $12\frac{1}{2}$ to $14\frac{1}{2}$ knots. There is little likelihood of the tonnage of this type of vessel increasing abnormally for some time to come; for it has been the experience of managers, that, at any rate for the general cargo trade, a steamer of about 6,000 to 8,000 tons dead weight capacity is convenient to handle under present-day conditions, which may involve touching at many ports, and there making up and breaking cargo. A vessel of this measurement can do a

¹ Cf. next chapter.

considerable amount of her own coasting work at less cost than is entailed by discharging a full cargo say at London, and then loading parts of it into smaller coasting or continental steamers for distribution to final ports of destination. Thus a cargo steamer from Australia will discharge part of her cargo at the Tilbury Dock, London, then run across to Dunkirk, proceed to Hull, and discharge some wool there, and perhaps visit two or three other United Kingdom or continental ports, before the inward cargo is discharged. Meantime she may have been taking in cargo at some or at all the ports at which she has touched. This new policy of using the ocean-going steamer for coasting and continental service is a fairly recent phenomenon, and may lead to interesting developments.

The cargo space in steamers of the type now under consideration is very much subdivided, and the question of utilising empty bunker space for freight purposes is also at times a possibility. Nor is it an easy task for those responsible to decide exactly where a given quantity of cargo shall be stowed. Commodities like heavy ores, and, at the other extreme, light measurement goods, may require much thought as to where they shall be stowed. Two questions arise in this connection: where is the best place for them consistent with the maximum of stability for the ship? And where can they be most easily handled when the port of discharge is reached? Great experience and knowledge of a ship's characteristics, and the conditions at sea are required in settling the first of these questions. To assist managers and captains in this difficult work, an instrument was invented some years ago, known as a stability trim and heel indicator. This ingenious instrument can be handled by either manager or captain, even though he has no scientific knowledge. The instrument consists of a case, containing a level plate on which is drawn a fore and aft sectional plan of the vessel, showing all the cargo and bunker spaces into which weight may be stowed. There is a system by means of which this plate may be suspended in a balancing frame, and by using a carefully calculated set of weights, the effect of placing cargo in any space, the combined effect of loading the ship with various grades of cargo, or any changes that may occur during the voyage, owing to partly discharging or taking in cargo, are at once registered. The great ingenuity of this apparatus can best be grasped by spending an

hour testing its various possibilities : for a ship employed in trades where many ports are visited, and cargo taken in and discharged at each, its utility would be difficult to exaggerate.

A number of ingenious inventions have of recent years added very considerably to the safety of ships at sea. For instance, a vessel can now hear and speak, thanks to wireless telegraphy. She can feel the approach of land or other vessels, thanks to automatic signalling ; she can feel the sensation of cold, thanks to recent marine inventions that have been fitted to the *Aquitania*, by means of which a lowering of the temperature owing to the presence of ice is at once communicated to the officer on the bridge. In a word, a vessel can now be so constructed and equipped that, not only is she self-propelled, but she possesses the means of employing most of the senses enjoyed by living creatures.

But the *Titanic* disaster was a rude shock to those who imagined that the modern steamship was unsinkable. And after two years, the sinking of the *Empress of Ireland* in ten minutes from the moment of being struck, once again, and with a terrible force, emphasised the necessity for taking greater precautions. No ship ought to be allowed to carry passengers, after these two awful warnings, that has not a double skin, as well as watertight decks and numerous watertight bulkheads. The *Aquitania* is probably the safest ship now afloat, and should be the standard for all ocean-going passenger vessels. "Boats for all" was the cry after the *Titanic* was sunk, but the latest disaster shows the ineffectiveness of boats for all in cases of sudden emergency. The obvious moral is that the great aim should be to make the ship safe, and no vessel should be allowed to carry passengers unless she has every safeguard that experience has proved to be necessary.

To conclude this chapter, a few words must be said about types of ships specially constructed or equipped for special trades. The two

Special Types of Cargo Steamers.

main types are the *tanker*, for carrying oil in bulk, and the *refrigerating ship*, for transporting frozen or chilled meat, and other perishable food-stuffs. Of

beef and mutton alone about 20 pounds are imported into the United Kingdom per head of population each year. This shows the immense development of a trade that commenced as recently as

the year 1880. The pioneer in the enterprise which has resulted in supplying us for over a quarter of a century with cheap meat, was

**Refrigerating
Ships.**

Sir Alfred Haslam of Derby. The successful carriage of dead meat over a long voyage entails two requirements—there must be first of all a machine, or methods, for generating cold air, and secondly, there must be some means for maintaining in the hold of the ship the low temperature thus produced. The system invented by Haslam included a refrigerating engine, capable of accomplishing the first requisite, and a system of insulation keeping out the heat, and preserving the low temperature created by the engine.

At present there are three systems for producing cold air, and two ways of insulating the holds where the chilled or frozen produce is to be stowed, either for transport or storing purposes.

**Various Systems
of Refrigeration.**

The three refrigerating systems are (a) by compressed air, (b) by compressed ammonia, (c) by the compression of carbonic anhydride. In the first of these, the air is drawn from the insulated chambers and compressed. This raises its temperature. Then it passes through coolers, and this cooled compressed air expands in a cylinder behind a piston, and so assists in driving the machine. In expanding thus the air

**Compressed
Air.**

loses heat and its temperature falls very considerably below freezing point. It is then driven back through wooden air passages into the insulated chambers, and produces a frozen atmosphere. The process is continuous; thus as the air in the chamber begins to lose its extreme temperature it is sucked out again, passed through the machine and returned re-frozen.

The second system entails drawing ammonia in the form of gas from the evaporator coils. It is then compressed and driven into the

**Compressed
Ammonia.**

coils of a condenser under pressure sufficient to liquefy it at a normal temperature. Then it passes to the regulating valve, and is allowed to flow gradually into the coils of the evaporator. There the pressure is reduced. The liquid becomes a gas once more, but in doing so becomes exceedingly cold. In its cold state it cools the air that is circulated in the insulated chambers, and in losing its low temperature, it recommences its progress through the machine—a process which goes on continuously.

The third process resembles the above except that brine instead of air is the medium for decreasing the temperature in the insulated chambers.

Brine.

To insulate a ship's hold is a difficult matter and one requiring great consideration. The method employed is to line the top, sides, and floor of the space to be insulated, with wood, leaving a space about 12 in. wide between the wood and the ship's side, or decks. This space

Difficulty of Insulation.

is then filled with either charcoal or silicate cotton, which effects the double purpose of keeping the cold in and the heat out when the refrigerating machinery is at work. Insulating a ship's hold entails the sacrifice of considerable cargo space ; and it must be remembered that, if there be no perishable cargo to carry, not only is there less space available for ordinary commodities, but the insulation may easily be damaged, if heavy goods such as ores, metals, machinery, and so on be carried. The trade has, however, now developed on such a great scale that it gives employment to over 200 insulated steamers. Originally invented to bring mutton from Australia and New Zealand, the success of the refrigerating engine has been so complete that the meat of the surplus animals from all parts of the world is now dealt with in this way, and a very great trade has resulted between the densely populated European and Asiatic countries on the one hand, and North and South America and Australasia on the other.

The year 1914 will probably be looked back to, half a century hence, as the year that saw the commencement of world-wide oil

The Oil Boom.

booming. Fifty years before the Americans had struck oil, after which the resources of Eastern Europe, and that part of the Russian Empire adjoining in Asia, have been increasingly exploited. It is practically within the last few years that the extent of the world-wide distribution of oil has been grasped. Not only is the supply world-wide, but the demand, even when it depended principally on two sources of supply, has been developing in every part of the world. From the moment that oil was discovered and utilised on a large scale, the problem of its transport has attracted some remarkably keen intellects. For local distribution the can or the barrel sufficed. For land transport to the more or less distant market the tank on wheels, or, for railway transportation, on bogies was adopted, in the first

instance. All these, however, proved to be uneconomic methods for distribution on land, when once the pipe-line had been tried. To-day, in connection with the oil fields that are being worked, there are pipe-lines in some cases having a length of hundreds of miles. By means of these pipes, the oil can be easily and cheaply transferred from the well to the town or seaport. So far, however, there has been no question of running a pipe-line under the ocean ; thus ships and steamers are required for the work of transport. Oil as a cargo presents many difficult problems to the ship-designer and manager, and owing to its nature it creates special dangers when loaded either in bulk or in packages on board an ocean-going vessel.

At first the oil that crossed the sea was filled into forty-gallon casks, the familiar paraffin barrel. But the transport of barrels in a ship's hold entailed, as a sailor would say, a great deal of *broken stowage*, that is, there was much space wasted. For freight charging purposes a definite space is allowed for 1 ton of measurement. This space, in the case of a steamer, is fixed at 40 cubic ft. ; a sailing ship allows 50 cubic ft. Exporters soon found that about four barrels of oil occupied the space of 50 cubic ft. allowed as 1 ton of space in a sailing ship, whereas a ton weight of barrels of oil required no less than 80 cubic ft. of space, or 2 tons of steamship allowance. Thus, if oil were shipped in barrels, about one-third of the space in a vessel was wasted, and it was seen that if the package could be eliminated, there would be a saving in the space required of at least 50 per cent. At the time, however, there was no definite attempt or suggestion to carry oil in bulk, but the 4-gallon tin case, packed two or four in a wooden case, was introduced. Case oil has become a familiar object all over the world ; and the case is likely to continue permanently in use because it is easily handled, and when the oil is consumed, can be turned to many useful purposes. Thus oil-ships to-day are constructed to carry oil either in bulk or in cases. There is one of these vessels which has a carrying capacity of no less than 90,000 cases, and the largest tanker in Lloyd's Register (1926) is the *G. Harrison Smith*, measuring 15,371 tons. But even taking all possible advantages into account, the case occupies space, and, for the principal markets, the transport by sea of oil in bulk is the most economical method. Not only can more oil be carried in a given space, but it can be run into the ship through pipes, and

pumped out when the destination is reached ; and both of these operations reduce terminal charges for loading and discharging to a minimum. For instance, a modern tanker can either load or discharge 1,700 tons of oil in bulk in about six hours. To handle this quantity of oil in barrels would require about four days. Hence the tank steamer, and the special depots for the storage of oil, are now familiar objects at all the great ports.

The first attempt to carry oil in bulk was made by a German, Herr Riedemann. He fitted a large sailing ship with square iron tanks on three decks, and by an ingenious arrangement of pipes, these tanks could be readily filled or emptied.

Carrying Oil in Bulk.

But before anything in the shape of a *tanker* could be constructed, some years of experiment were necessary. Oil is affected by temperature ; a rise of 20 degrees Fahrenheit will cause an expansion of about 1 per cent. Thus, if a tanker be fully loaded and the tanks sealed, unless special provision be made for possible expansion or contraction, there is the danger on the one hand of the oil bursting the tanks, or of a space being created, which in rough weather, would be a cause of serious danger, if the oil had room to wash about. In the year 1885, a medium-sized steamer was converted, on the Tyne, for the carriage of oil in bulk. This experiment proving a success, within twelve months, a vessel was specially constructed for the purpose. Great care has to be taken with the caulking of all butts and joints, as paraffin is more penetrating than water, and a coffer-dam separates the hold space from the engines and boilers. There were various objections to the employment of tankers. And as a consequence the Suez Canal Company refused them passage through their route until the year 1902. At present, special precautions are taken, but tank steamers carrying oil in bulk are to be seen on every ocean. In the year 1912, Lloyd's Register contained the names of no fewer than fifty sailing-ships and 258 steamers fitted as tankers ; whilst in 1926 the Register contained 1,156 steam and motor tankers, with an aggregate gross tonnage of 5,664,786.

The economic advantage of this means of transport has been calculated to amount to no less than 1½d. on each gallon of oil transported overseas.

CHAPTER III

THE ECONOMICS OF MARINE FUEL

THE great factor to-day in ocean-transport is fuel. Ship and engine have been greatly improved, methods of conducting the business have changed, routes have been modified, and further modifications may be expected as a result of the success of the Panama Canal; but throughout all these, and above them all, dominates the commodity whence the power for driving the vessel is obtained.

Importance of Fuel in Ocean Transport.

It is no exaggeration to say that the nations which control the resources whence motive power can be produced, will in increasing measure have the opportunity of dominating the rest of the world. But incumbent on them is the necessity of so exploiting and developing their resources that they may obtain a maximum of power at a minimum of economic waste. The generation of artificial *productive power* will, as the importance of purely *destructive power* wanes, become increasingly the great factor in deciding the status of nations. Nor is this an entirely new situation. The important novelty is that artificial methods for producing power for practically all purposes, but notably for propelling ocean-going vessels, have proved their complete superiority over all old world and natural methods. Whence it arises that the people who have the acumen to take the fullest possible advantage of the new position, will, provided that their resources are adequate, and their inherent qualities are sufficiently virile, be able to take and retain a place in the front rank.

Control of Resources.

The fuel resources of the world to-day consist, for the purpose here in question, of coal and oil. The countries enjoying in the greatest degree resources, either worked or unworked, are the British Empire, the United States of America, Russia, and China. All these, except perhaps the

Coal and Oil Regions.

last, are aware of the great issues at stake, and China is awakening to a sense of her great advantages, and to a knowledge of the vast resources which have hitherto lain undeveloped in her widely stretching dominions.

Here then is a question of world-wide interest, one important section of which can be studied to advantage in considering the economics of marine fuel.

The evolution of the modern marine engine is a story of consuming interest ;¹ here it is only possible to give an outline of the main points.

Evolution of the Marine Engine.

No sooner had James Watt produced a steam-engine, than attempts were made to apply steam power to ship propulsion. At first the experiments were almost grotesquely unsuccessful. But the men at work on this development were men of grit, nor could any failure daunt them in their efforts. The chief spheres of action were the West of Scotland and the North East coast of America ; with the result that both Britain and America claim the honour of having been the first to propel a water-borne craft by steam power.

Two facts, however, stand out among a great mass of controversy, and these should please the pride of both countries. In the year

The First Steamships.

1802, William Symington built and engined the *Charlotte Dundas*, a small craft which ran on the Forth and Clyde Canal, and was proved to be efficient for both passenger and goods services. This little craft was the germ whence sprang the *Clermont*, built by Robert Fulton at New York in the year 1807, and the *Comet*, the first steamer to run regularly in European waters, built by Henry Bell on the Clyde in the year 1812. Thus Symington solved the problem of steam propulsion by the construction of the *Charlotte Dundas*, whilst Fulton was the first regularly to utilise the invention on any scale, for he ran the *Clermont* on a regular service between New York and Albany, a distance of about 130 miles, from the year 1807.

From the beginning of last century there were two great possible developments in the business of ocean transport ; the substitution

Development of the Steamship.

of iron for wood as the material for ship construction, and the improvement of the steam-engine to a point at which steamers could compete on commercial lines with sailing ships for the carriage of freight. Nor were these separate problems, for really the success of either depended on a common development. The modern marine engine could not work to advantage in a wooden hull, nor

¹ Cf. *British Shipping*, by A. W. Kirkaldy.

is it possible at present to imagine an *Aquitania*, measuring nearly 50,000 tons, propelled otherwise than by turbine engines driving quadruple screws.

As inventors and manufacturers have experimented with and finally produced a serviceable motor-car, and in much the same way as aviators are succeeding in producing a reliable aeroplane, so, three-quarters of a century ago, the forerunners of these men were giving their attention to the production of a marine engine which should be capable of propelling vessels of the largest dimensions over thousands of miles of ocean. The problem was by no means easy to solve. Engines and boilers had indeed been successfully fitted to small craft, and many of these were operating more or less usefully in European and American waters. The object that claimed the attention of the engineer was to increase the power and endurance of these engines several hundredfold in order that oceans might be traversed. Among innumerable difficulties, there were some of such outstanding importance that, unless they were overcome, success was hopeless. The low pressure paddle engine was useful for passenger and mail services, as the mail coach on the turnpike road had been ; but it offered no economic advantage for more serious work. These low pressure engines, even when improved to the greatest point of efficiency, entailed a very serious consumption of fuel. When worked at a pressure of about six pounds to the square inch, a boiler consumed no less than ten pounds of coal for each horse-power produced per hour ; thus the amount of bunker space required by a steamer crossing the North Atlantic was such that only mails and passengers could be carried, and there was little or no space available for cargo. As an illustration of what such conditions would mean to-day, one need but remember that a steamer of the dimensions and horse-power of the Cunard liner, *Mauretania*, had she been fitted with low pressure engines of the type in vogue sixty years ago, would have consumed the enormous quantity of between 7,000 and 8,000 tons of coal in the twenty-four hours, whereas with modern turbine engines, her daily consumption was only about 1,000 tons.

There was another great problem that awaited the solution by those interested in ocean steaming. With engines consuming such comparatively large quantities of coal, frequent facilities for

replenishing bunkers must be provided. For it must be remembered that when the steamship entered the lists there were no conveniently situated coaling stations on any of the great ocean routes as we have them to-day. The equipment and organisation of these stations has been the direct or indirect work of the steamship owner.

**Need of Coaling
Stations.**

It was mainly these two problems, the large coal consumption of low pressure engines, and the lack of suitable coaling stations, which were the inspiration of Brunel, when he thought out the construction and equipment of the *Great Eastern*. The solution of the chief difficulty confronting the marine engineer was clearly the invention of either the compound high pressure engine, or a vessel of the dimensions of the *Great Eastern*. This is obvious to-day—it was clear to very few people in the early 'fifties of last century. Brunel's theory was that by constructing a leviathan ship of 20,000 tons, the engines required for her propulsion might be, as compared with those for a 2,000 ton vessel, of very reasonable proportions, for when such a mass was once in motion it would require less force proportionately to keep it going at a fair speed ; nor was he in error in this. The *Great Eastern* was designed so as to make a voyage to the Far East without requiring to replenish her bunkers, and yet she had quite considerable cargo carrying capacity in addition to carrying the fuel required for her boilers. Being also fitted to carry an exceptionally large number of passengers, this ship was, in theory, capable of making handsome profits for her owners. It is unfortunate that heavy initial expenses caused the managers to modify their original scheme for the working of this ship. It may be true that the Far Eastern trade was not then sufficiently developed to employ so large a ship, but the fact remains that the experiment was never actually made, and that after engaging in the Atlantic trade at a loss, the ship barely justified her construction by the important work she did in laying submarine cables.

**The "Great
Eastern."**

As to the development of a system of coaling stations along the main ocean routes, this was gradually accomplished owing, in the first instance, to the exigencies of the mail and passenger services. The accession of Queen Victoria in the year 1837 marks the commencement of the era of steam for long sea voyaging. The Peninsular and Oriental Steam Navigation Company was

founded that same year. In 1838 regular steamer services were commenced across the North Atlantic, and within twelve months the

Cunard Company came into existence. When once

**Development of
Steamship
Communications
and Routes.**

Europe and America were connected by steam services, it was obvious that other parts of the world would expect equal facilities. The British Government was not then directly responsible for India, as it became after the Mutiny, but there was a mail and passenger traffic of first-class importance between England and India, which owing to the great interests at stake, had to be maintained with the utmost efficiency. The P. & O. Company became responsible for the conveyance of mails to Alexandria, and in connection with this they organised an efficient passenger service. Mails and passengers proceeded by the overland route from Alexandria to Suez, where auxiliary steamers of the Indian Government carried them to their destination. Eventually the whole of this service was taken over by the P. & O. Company, and the route was equipped with coaling and repairing facilities.

So long as Australia remained agricultural, there was but little effective demand for a steamship service for mails and passengers. But with the discovery of gold in Victoria during the 'fifties, a different type of settler entered that continent, and with growing business, conducted, in consequence of the gold, on the most modern lines, a clamour for efficient steamship communication broke out and had to be satisfied. Then came the great work of Ferdinand de Lesseps, and a steamship route to the Far East and Australasia, via the Suez Canal, resulted. It was merely a matter of time to equip the whole of these routes with the necessary conveniences and facilities for steam services, and as a consequence, by the early 'eighties, the whole of the Far East and Australasia, including New Zealand, had been brought into direct steam communication with Europe.

The steamship routes were thus gradually equipped with coaling stations, and the fuel at these stations was, for a considerable period, exported entirely from the United Kingdom,

**Equipment of
Coaling Stations.**

mainly by sailing vessels. The stations and the fuel were British. The expenditure connected with this organisation was very heavy, but in the case of mails and passengers, speed, not expense, has always been the main consideration.

So long as the steamship was in the experimental stage she was a luxury, and could only be employed on services where expense was a minor object. The important point to notice is, that the mail steamer did begin to operate along ocean routes of considerable extent. These routes were equipped with coaling and repairing facilities, and as the organisation was improved, these stations were prepared to supply not only mail steamers, *but all comers*, with fuel, and render other services. When the compound marine engine was perfected, it came about that owing to the establishment of these necessary adjuncts to steamship services on all routes, cargo steamers, which without subsidies could not previously have competed with sailing ships in transport services, were now placed in a position of advantage. Thus, although the payment of subsidies to them was neither suggested nor indeed possible, cargo steamers in increasing numbers and size made their appearance, and gradually ousted the sailing ship, proving their economic superiority, in fair competition.

To John Elder, of Glasgow, belongs the credit for the revolution wrought by the compound-engine. His experiments almost immediately resulted in reducing the coal consumption of marine engines to a little more than one-third of what it had been. With a working pressure of 60

Revolution in Marine Engines.

pounds to the square inch, instead of requiring 10 pounds of coal per horse-power, it was found that about three and a half pounds sufficed. Since John Elder's day, further inventions—triple and quadruple expansion, working at a pressure sometimes considerably over 200 pounds to the square inch, requiring only a fraction more than one pound of coal¹ per horse-power per hour—have completed the victory of mechanical propulsion over sails.

Thus, to-day, the sailing ship is for all practical purposes a negligible quantity. The reciprocating marine engine attained its highest perfection at the beginning of the present

The Reciprocating Marine Engine and Modern Steamships.

century. Quadruple expansion engines at high pressure, and driving four propellers, reached a maximum of speed and efficiency in vessels like the *Kaiser Wilhelm II*. This fine vessel measures nearly 20,000 tons, and has engines indicating 45,000 horse-power. She attains a speed of nearly 24 knots on a consumption of about

¹ For the details of these inventions cf. *British Shipping*, Book I, Chap. XIII.

700 tons of coal a day. These figures are worth noting, for when the Cunard Company arranged with the Government to build for the North Atlantic service two larger and faster steamers than anything in existence, it was seriously doubted whether it would be possible to carry out the scheme. But another possibility was by that time (1907) available. As far back as 1894, the *Turbinia* had been built at Newcastle-on-Tyne, and to this comparatively small craft a new type of engine had been fitted by the inventor,¹ Mr. C. H. Parsons. These engines, known as steam turbines, included the adaptation of a very old principle, but the application was completely novel, and the invention has worked a remarkable change in marine engineering. The speed attained by the *Turbinia* broke all previous records, being no less than 34 knots. After many experiments in high-speed Government vessels, this new type of engine was fitted to the *Victorian*, the *Virginian*, and the *Carmania*, all large steamers on the North Atlantic service. It was the success of these, especially of the *Carmania*, owned by the Cunard Company, which, after much consideration, led to the decision that the two special vessels to be constructed for the Liverpool-New York service should have turbine engines. These two fine vessels, the *Lusitania*, built on the Clyde, and the *Mauretania*, built on the Tyne, were placed on the service in the year 1907. Their achievements have outdone all previous records. The *Lusitania* in March, 1914, made a record day's run of 618 knots, at an average speed of nearly $26\frac{3}{4}$ knots, beating the previous record of the *Mauretania*, which was 614 knots for the day's run. The fuel consumption averaged about 1,000 tons per day, and the engines indicated about 70,000 horse-power.

The *Lusitania* was sunk during the war. The *Mauretania*, after nineteen years of service, may still be described as the finest ship afloat. Four years ago, in March, 1922, she was thoroughly overhauled by the builders at Newcastle, and was then converted from a coal burning to an oil burning ship. Sufficient of the bunker space was rendered oil-tight to store about 5,350 tons of liquid fuel, and all the boilers were fitted with oil burning apparatus. The builders in describing the change say—

The advantages of using oil fuel instead of coal are very great. The time occupied in filling the bunkers is reduced to a very large extent.

¹ Now Sir Charles Parsons,

The absence of coal dust does away with a good deal of labour in cleaning the ship. The steaming efficiency of oil is much greater than that of coal, so that fewer boilers need to be used for maintaining the same speed as when coal is used. Furthermore, a greater reserve of power can be kept in hand to make up for time lost by reason of bad weather or other adverse conditions: or else a higher speed can be developed. The number of hands in the stokeholds was reduced from 328 to 90, and, of course, the laborious and heavy work of the stoker disappears.

The experience of the change from coal to oil has had excellent results, for the ship has maintained her fine records with less effort. In August, 1924, she surpassed her previous Eastward records from New York to Cherbourg, a distance of 3,198 nautical miles at an average speed of $26\frac{1}{2}$ knots, *i.e.*, $30\frac{1}{4}$ miles (just over $48\frac{1}{2}$ kilometres) an hour. On two consecutive days she steamed 625 and 626 nautical miles, and the time taken for the crossing was 5 days, 1 hour, 49 minutes. The horse-power of the *Mauretania* is now 80,000.

At first the turbine engine could only be fitted to vessels where speed was the great object, it being proved by experience that the greater the speed attained, the greater was the saving of fuel effected, whereas for slow-going vessels, the turbine offered no great advantages over the ordinary reciprocating engine. Early experiments showed that in the case of a steamer having a speed of 14 knots the running expenses of the two types of engine were equal; as, however, speed increased, the turbine showed an increasing economy, but at a speed of less than 14 knots the reverse was the case. Twelve years ago, however, the effects of gearing were tried, and it was found that, even for slow-going cargo vessels, the turbine, when the speed of the propeller was reduced by gearing, could be the economic rival of the reciprocating engine. A steamer called the *Vespasian* was fitted with this new type of engine, and experience now ranging over nearly twelve years have convinced some shipowners of the superiority, not only in economy of consumption, but in reliability, of the turbine engine for slow-speed vessels. The situation has, however, become complicated by the appearance of another rival, in the shape of the internal-combustion engine. It would appear that in this development, the attention of British engineers was so keenly focused on the relative merits of the reciprocating and turbine engines, that for a time they neglected or treated with

disdain the invention of Dr. Diesel. The engineers of other countries,¹ however, were attracted by the Diesel engine, with the result that Russia and Scandinavia were at first ahead of the United Kingdom in its application to practical commerce. To-day, however, the whole engineering world is awake to the great possible advantages of an engine that requires no boilers, and consumes a minimum of fuel.

That British builders and owners are fully alive to the present situation is proved by the occurrences of the past two years (1924–1926) ; a period which will probably mark the opening of a new epoch, since a number of mail and passenger vessels driven by motor engines then made their appearance. One of the first of these was the *Aorangi*, measuring 17,500 tons, both ship and engines being built on the Clyde. It must be admitted that the engines were constructed, by permission, from Swiss patents. This fine vessel is now on the Pacific, trading between British Columbia and Australasian ports. Foreign rivals were not slow to follow the British lead. Towards the end of 1925 the *Gripsholm*, of practically the same tonnage as the *Aorangi*, was built on the Tyne for Swedish owners. The engines in this case were constructed at Copenhagen. The English Royal Mail Company made the next move by building the *Asturias*, a vessel of no less than 22,500 tons for the South American trade. In this case Harland and Wolff produced both hull and engines. The result was described as “ the world’s largest super-motor liner.” The same owners were so satisfied that they ordered a sister ship from the same builders. Then Italy came along building, in Italian yards, two large motor liners, one of 25,000 and the other of 33,000 tons. It is interesting to note the considerable increase in tonnage in but a few months.

In another sphere of shipping it should be noted that the *Upwey Grange*, built at the end of 1925, was the largest British motor driven cargo ship afloat. This ship measures just over 9,000 tons, and is fitted with refrigerating machinery. But British owners are still holding their hand and awaiting results ; for some of them steam raised by coal still has its appeal.

A motor ship costs somewhere about 20 per cent. more than a steamer ; thus, if cheap coal continues to be available, the day of the steamer may last some time yet. The disastrous coal strike of this

¹ Cf. *British Shipping*, pp. 144–147.

year (1926), however, may, and probably will, have dire effects on the position, only time can show.

After some experience it has been asserted that five motor ships can do the work of six steamers, but this has yet to be proved. The whole position is full of interest. Undoubtedly we are on the eve of further progress in shipping services—both *liners* and *tramps* are being affected, and the next five or ten years will probably be as fateful as those just after the middle of last century, which saw the introduction and gradual perfecting of the compound engine.

Thus at the present moment the shipping community, in common with marine engineers and architects, are keenly watching the performances of rival methods of propulsion. The quadruple expansion engine still has some advocates, but it would appear that the ultimate contest will be fought out between the geared turbine and the internal combustion engine.

Battle of the Rival Engines.

COALING STATIONS, THEIR EQUIPMENT AND SUPPLY

As has already been shown, the first coaling stations were organised to meet the requirements of British mail and passenger steamers, and the coal supplied was the product of the collieries of the United Kingdom. This latter fact has had a great and unexpected effect on the British mercantile-marine. Until the American Civil War there had been a great rivalry between the English and Americans for commercial supremacy at sea. After the war the field was left mainly to British shipping. The Americans, it is true, turned their attention almost entirely to the internal development of their country, but the appearance of the iron ship, and the application of steam propulsion, were big factors in the situation, and these very naturally helped the British shipowner. The United States was not at that time a great producer of coal and iron. The work of developing the mineral and other resources of the country was to prove all engrossing for the next quarter of a century. But at the end of that period the American people had shown their determination to be no longer mainly producers of food-stuffs and raw materials. Nor would they be content to

British and American Rivalry for Commercial Supremacy.

supply older States with the food which would enable them to devote their best energies to manufacturing the raw materials, much of which was also the produce of the western side of the Atlantic. Owing to the bountiful and easily worked supplies of iron and coal discovered in large areas of the United States, not only have the Americans become producers of both fuel and steel, but they have eclipsed all competitors in these industries, and are now producing nearly one-half of the world's supply of coal, and rather more crude steel than both the United Kingdom and Germany together. It was soon found that there was a great possible internal demand for these prime necessities of the modern State, and this when once awakened, was found to be capable of an almost unlimited extension. The vast area of the country, and the necessity for railway extension, created a great and growing demand for the products of the mine and of the smelting works. To-day, with a new annual construction of railway track averaging about 4,000 miles, and the inevitable renewals of the older sections, there is a greater demand for iron and steel for railway purposes in the United States than from the whole of the European railway systems. But in addition to this the American initiated the utilisation of steel for many purposes for which previously it had not been considered suitable. Thus the steelmaster and the structural engineer have, to a very great extent, supplanted the stone quarry, the brickfield, and even the builder and architect ; for the modern building in America is steel framed, the brick or masonry being a filling or a covering, the strength of the structure depending on girder, angle, and rivet. As the Scandinavian countries are supremely the home of the wood industry, so has America become the great steel country. For a considerable time the internal needs of the country required all the coal and steel produced ; that period is at an end, and America is increasingly prepared to compete in markets which were for long almost the monopoly of the English trader.

The shipbuilders and shipowners of the United Kingdom were the first to apply steam to purposes of ocean transport, and the employment of the marine engine hastened the coming of the iron and steel hull for ships. In this, again, Englishmen were the pioneer workers. Then as the steamer ousted the sailing ship in trade after trade,

**British Coal
and Mercantile-
Marine.**

the importance of the British mercantile-marine grew, and with it the demand for British coal. These two things acted and reacted upon each other with a marvellous effect in building up a very great commerce. English coal was purchasable at almost every seaport in Europe, Asia, and Africa, and at the many coaling stations that had been established on islands conveniently situated in mid ocean on the main steamship routes. The effect of this fact is of the utmost importance, and must be realised in all its bearings, for it has been a great cardinal factor, perhaps the great factor in modern shipping business. The United Kingdom having definitely given the preference to manufacturing industries over agricultural pursuits, and being no longer able to supply herself with food-stuffs, has for long decades now been compelled to import foods of various descriptions, as well as the raw materials for some of the most important of her manufactures, in ever larger quantities. These commodities, food and raw materials, are for the most part bulky, and require shipping of great carrying capacity to transport them. When the food has been consumed, and the raw materials manufactured, the United Kingdom has been able to supply the wants of a great part of the world with manufactured goods of every description. These goods, however, are of but small bulk as compared with the great bulk of the raw materials which make up the major part of our imports. Were it a case of importing raw materials and food-stuffs, and exporting manufactured goods, the majority of ships leaving our ports would be but half loaded. The result would be that freights would be higher, and world trade would be contracted. But another influence entered upon the scene and produced a situation which, whilst tending to equalise the imports and exports of this country in bulk, at the same time, by giving British shipping a full outward freight, placed British owners in a peculiarly advantageous position to compete for the ocean carrying-trade of the whole world. Whilst the United States and Germany were developing their coal resources, England had already passed through that stage. Her mineral resources, too, were of considerable extent, and as at the same time she had developed steamship communication, which demanded great quantities of coal to be in readiness for bunkering purposes on all ocean routes, England was in a better position to supply that need from all points of view.

The industries connected with shipping worked into each other's hands, with the result that somewhere about two-thirds of the world's commerce has been carried on under the British flag during the past half-century.

**British
Pre-eminence.**

It was but natural that other countries should endeavour to enter into competition with the one favoured nation. On the Continent of

**Foreign
Competition.**

Europe great efforts have been made and great results have accrued. Germany has shown that she can be successful in the arts of peace and commerce. Indeed she attained a success which was calculated to benefit her destiny in a manner that mere conquest by force could never hope to achieve.

Nearly every shipping port of Western Europe has felt the forward impulse, and the progress made has in many cases been phenomenal. During the long period of peace,

**Advance of
Foreign
Countries.**

which came to an end in 1914, commercial enterprise afforded an outlet for virile energies, with the result that in every continent the progressive nations took upon themselves the task of modernising and developing what was behind the times or inert. Thus there was an unexpectedly great expansion of international trading relations, and, whilst Englishmen were able to hold, and even to extend, their own spheres of influence, neighbours and competitors were also able to achieve very remarkable results. This point should be remembered, for with the work of development going on in every continent, the resources of the land area of the world have been more and more searchingly exploited. So far, however, it is safe to say that but a very small percentage of the mineral wealth of the world has been brought within the range of commercial utilisation, but that sphere is being extended every day. The effects of this unceasing activity can easily be discerned. It is not so many years ago that English coal alone was available at the fuel stations on the principal ocean routes. But the scientist and the business-man have worked together in discovering and making available the coal resources of every continent. With the opening up of other sources of fuel supply for shipping purposes, the area that can be economically supplied with English coal has experienced a gradual restriction. But although this tendency becomes accentuated, its effects are

not visible to the superficial observer, because all that he notes is the increasing export of the output from the collieries of the United Kingdom. The facts of the situation are that with a restricted area demanding our coal, there has been a greatly increased demand within that area ; hence the fact that certain markets demand smaller quantities, or none at all, is only known to the coal exporter and the freight market.

The coaling stations on the Suez route to the Far East and to Australasia were exclusively supplied with English coal. But Australia, New Zealand, India, China, and Japan have all been steadily improving both the quantity and quality of the coal they can put on the market, and

**British v.
Foreign Coal.**

the competition has for some time now been felt throughout the Far East. The quality of some of these coals is not equal to that of English coal, but being on the spot, and labour being cheap, the difference in price is sufficient to make in some instances the poorer quality coal rather more economical for the ordinary cargo steamer to consume.

The most remarkable instance of local coal, not only successfully competing in its own markets, but carrying its competition to unlooked for distances, is the coal of South Africa.

**South African
Coal.**

Up till the period of the Boer War, this coal was only used locally, it was of poor quality, and its production was carried on in a comparatively small way. But during the war, large numbers of transports were employed carrying troops and stores to South Africa. The bunkers of these ships had to be replenished at their destination, and so the demand for the local coal began to grow very considerably. With increased production a better quality of coal was reached, or it may be the nature of the coal became better known. The result has been somewhat surprising. It has affected both the Australian route and the Australian trade. Prior to the Boer war there were some few steamers that went to Australia and New Zealand via the Cape of Good Hope, but very few returned that way.

The homeward route was via Cape Horn, and steamers returning thus replenished their bunkers at South American ports, such as Monte Video, *and with English coal*. Some steamers still use this route, but an increasing number return via South Africa where that route is not barred by the terms of the charter party,

and benefit by the cheap coal there available. Nor is this the whole of the story, for South African coal is now exported in fairly large quantities, and competes with English, Japanese, and Indian coal at stations like Colombo and Manila. At Colombo¹ (1914) it sold at 10s. per ton less than Welsh coal, and was only 3s. 6d. per ton more than best Indian coal. At Mauritius it was 9s. 6d. per ton cheaper than Welsh, and 6s. 6d. per ton cheaper than English North Country coal.

Australian coal, the best of which is said to come within 12% in fuel value of Welsh, is also subject to exportation, and can compete in the various coaling stations east and south of Colombo.

**Australian
Coal.**

But for the most important developments, attention must be directed to America. American coal has already made its appearance in various European markets, and some authorities predicted even before the strike of 1926 that it would be competing with our own coal in the markets of the United Kingdom before long. The coal is of excellent quality, and in spite of the comparatively high wages paid in America, the coal measures being at or near the surface, and it being possible to utilise machinery extensively underground, the getting is accomplished at considerably less cost than in the collieries of this country. Good coal was sold pre-war at the Panama ports at 17s. 6d. per ton, and it was asserted that when the Canal was fully opened, American coal of good quality would be available at either end of the Canal at a price not exceeding 19s. 6d. per ton.

**American
Coal.**

On the Suez Canal, where under normal conditions English coal has predominated, the prices are much higher than this; the pre-war price¹ for English coal at Gibraltar was 24s. to 24s. 6d. per ton, and in 1913 it was 2s. per ton dearer, possibly owing to the coal strike of 1912.

**Coal on the
Suez Route.**

At Port Said, and at the stations to the East of the Canal, prices naturally rule higher still. With the Panama Canal open to traffic, and the American route in full competition with the English route to the Far East, the cost of fuel will be one of the determining factors as to which route shall be followed. Nor is the advent of American coal, shipped by American ships to American stations,

¹ For quotations 1916 to 1926 cf. Appendix.

a pleasurable prospect for British shipping interests, for with the export of coal on a large scale, American shipping may again become a serious¹ competitor for the ocean transport services.

It is necessary to have normal figures for the purposes of making clear the position, thus the figures² in the foregoing section have been allowed to stand, although they are pre-war; comparison can be made with coal prices to 1926 by turning to the Appendices.

After the Armistice (November, 1918), although it was hoped that business as usual might gradually develop, it was found, as might have been expected, that the aftermath of the war resulted in the development of a very artificial state in commercial affairs. Reparation payments in coal, and the occupation of the Ruhr by the French, to mention only two points, had the effect of disturbing the fuel markets and conditions of fuel supply. Then disastrous strikes, more especially those in Great Britain connected with the coal of 1921 and 1926, accentuated the difficulties of the position. The long continued strike of the latter year, lasting as it did many months, resulted in unexpected sources of supply being utilised in European markets and in Great Britain itself. One railway company alone is said to have imported over 1,000,000 tons of coal from the United States, and large quantities of coal have been brought to this country for various purposes. It is much easier to disturb the well-established trade grooves than to re-establish them after a period of industrial strife. It will probably be some years before the conditions brought about by these two strikes, especially the latter, settle down and normal conditions once again obtain. The disturbance of trade caused by such strikes is extraordinarily wide. The freight market is affected as much as the coal market. Moreover, human ingenuity sets to work to provide substitutes or to contrive economies, and these are bound to have more or less lasting effects. It is fairly safe to foretell that the conditions under which coal will be mined, marketed, and consumed will never be the same again as they were before 1926, and this will have its repercussion on other forms of fuel and other methods of producing heat, notably on oil and shale, but also on electricity, gas, and water power.

¹ For the details of this cf. *British Shipping*, pp. 414-428.

² Cf. Appendix.

THE ECONOMICS OF OIL FUEL

In its crude state, coal can only be utilised for steam-raising purposes in a furnace. Moreover, crude coal is a bulky commodity, difficult both to stow and to handle on board ship even under favourable conditions. But conditions are not always favourable, and it is necessary to have easy access to the coal, and facilities for handling it, whatever may be the circumstances of the moment, either at sea or in port. Consequently the bunker space in a steamer has not only to be in close proximity to the boilers, but in order to facilitate trimming and stoking, space that would otherwise be valuable for cargo-carrying purposes has to be sacrificed. The coal bunkers of the average steamer occupy what would be some of the best cargo space in the vessel. A steamer of medium tonnage, consuming about 60 tons of coal a day, in making the voyage from Europe to Australia, with only one bunkering port *en route*, must ordinarily carry nearly 2,000 tons of coal. A ton of Welsh coal measures about 42 cubic feet, whilst coal of various qualities may measure anything between 42 and 52 cubic feet to the ton. Hence the space occupied by the bunkers is very considerable. In actual practice when coal is cheap and freights are low, a steamer on a long voyage will sacrifice freight space and carry as much coal as possible, but should freights rule high, then as little coal as possible will be carried in order to earn the utmost possible freight. A point like this requires more experience to benefit by than appears at first sight. Comparatively small increases or decreases in freight rates and the price of fuel may, under experienced management, make all the difference between a profitable or an unprofitable voyage, or between a very ordinary result and an exceptionally good one. A knowledge of the coal markets and the various qualities and measurements of coal are as essential in the successful management of steamers as is experience of the freight markets. In a sentence, the space occupied by coal, its nature and the difficulties attendant on its use, very considerably affect both the cargo-carrying capacity, and the economic handling of a steamer. These facts cannot be too strongly emphasised at the present moment, when another fuel and other methods of propulsion are on their trial, with results already recorded which warn the progressive shipowner that a new era in shipping may have dawned.

Whilst coal can only be utilised in a furnace, oil offers alternative advantages. It can be used to raise steam in ordinary marine boilers, or it can be so used that boilers may be dispensed with. Both these methods result in effect-

**Advantages of
Oil Storage.**

ing economies as compared with coal consumption

at present prices. Careful experiments prove that where oil is substituted for coal as the fuel to raise steam in marine boilers, one ton of oil will, on the average, do the work of one and a half tons of coal. Here at once attention is arrested because even the tyro in shipping business will realise that one-third of the bunker space is immediately economised, for oil occupies on an average about the same space as coal, viz., 40 to 46 cubic feet to the ton. But this is only the beginning, and by no means the greatest economy effected. Coal requires not only greater space, but some of the best cargo space in the ship. Oil can be stored almost anywhere so long as the receptacle is not leaky. Owing to this, oil fuel can be pumped into any out-of-the-way part of the ship, and spaces which could not be utilised for freight-earning purposes are rendered valuable in that they may contain the oil, and so set free more eligible spaces for freight-earning purposes.¹ Oil may even be carried in the ballast tanks, and thus almost every cubic foot of space in a cargo steamer may be made productive. From this it can be seen that the use of oil fuel results in a considerable gain of space, but the advantages go farther yet. The transport, handling, storing and stowing of the oil cost less, and less labour is required in the stokehold. About one-third of the firemen may be dispensed with when oil is substituted for coal, and no trimmers need be carried, for oil trims itself. Fewer men require less accommodation and consume less food, hence wages and food bills are reduced ; and the space which the extra hands required may be used either to improve the living quarters of the staff, or to carry more cargo, or perhaps both these may be effected. An experiment was tried on two of the Canadian Pacific Company's steamers in the year 1913, which resulted in proving that the substitution of oil for coal in a steamer of about 4,000 tons, fitted with ordinary reciprocating engines, may result in a saving of over £30 a day.²

¹ 1920, the *Aquitania* converted into an oil-driven vessel.

² *The Syren and Shipping*, 16th April, 1913, p. 62.

If, however, the internal-combustion engine be substituted for the reciprocating engine, the saving effected is considerably greater.

**Saving
Effected by Oil.**

For in an internal combustion engine one ton of oil will do the work of four tons of oil used to raise steam in marine boilers. Hence the saving of oil over coal is greater still if the internal-combustion engines be substituted for the steam-engine and boilers. For not only is there a saving as to space for storing the oil, but as no boilers are required for the Diesel type of engine, considerable space is gained for cargo carrying purposes and there is a further reduction in the number of hands necessary for the work of the engine room, neither firemen nor trimmers being required, though the engineering staff may have to be increased in number. Thus the food bill, too, is reduced, as is also the space required for accommodation.

**Effect of Oil
on Labour.**

By no means least among the benefits which may be expected, if the internal-combustion engine can prove its superiority in every respect over the old type of marine engine, is the beneficial effect upon labour. The hard incessant work in the stokehold has a brutalising effect upon the men employed. Firemen are a difficult set of men to manage, but it is the conditions of their employment that have produced a type of man for whom one cannot help feeling pity. The life of the ordinary sailor in cargo ship or steamer is no bed of roses ; indeed, he has suffered many a hardship and lived a fairly thankless existence. But he at all events lives mostly in the open air, and has his small compensations. The fireman, on the other hand, has frequently to play the part of a hero, and has generally to work strenuously under extremely hard conditions. Even in the best equipped vessels his lot is the least enviable of anyone employed. What wonder then that he frequently gives himself up to drink, and sometimes degenerates to a condition hardly above that of the brute creation ? The utilisation of oil for marine fuel will wipe out this blot on the fair fame of shipping, and lead to a great improvement in the condition of shipping labour. For this alone its possibility should be welcomed by all who care for their fellows. A peculiarly brutalising form of work will be ended when no artificially propelled vessel contains either stokehold or coal bunkers.

It would appear that the problem facing shipping managers will

be the possibility of obtaining a supply of oil in all parts of the world on terms that will compare favourably with coal, and that they may have the assurance that this supply will not only be regular but will be permanently available.

**Is Oil
Available ?**

So far as the sources of the supply of oil are concerned, these are now known to be far greater than was even recently thought. For oil is found not only in the fluid state, but there are various shales, clays, and coals, from which it can be distilled. This latter point opens up one of the romances of scientific research and business enterprise. Oil in the fluid state has hitherto been subject to monopoly trading. The organisation of this has been rendered easy owing to the fact that mainly two countries—America and Russia—have been able to control the world market.

In 1901 the output of oil was given as something over 22,000,000 metric tons. By 1912 this production was more than doubled, the figures being 47,250,000 tons. Of that 47,250,000 tons, nearly 30,000,000 tons, or over 62 per cent., were produced in the United States ; nearly 9,500,000 in Russia, just over 19 per cent. ; 2,250,000 in Mexico, nearly 5 per cent. The other contributing countries were the Dutch East Indies, Galicia, India, Peru, Japan, Germany, Canada, and Italy. Ten years later (1922), no less than 112,500,000 tons were produced. Of this, America¹ produced 73,000,000 tons, or nearly 65 per cent. ; Mexico 24,500,000 tons, 22 per cent. ; while Russia produced barely 4,000,000 tons, 3½ per cent. ; Persia just under 3,000,000 tons, or over 2½ per cent. Other contributing countries were the Dutch East Indies, Rumania, India, Peru, Poland, Venezuela, Sarawak, Argentina, and Trinidad.

In 1924 the world's production was over 143,000,000 tons, of which the United States produced nearly 70 per cent. and Mexico 15 per cent.

The number of countries which have commenced of recent years producing oil, and the reports, official and otherwise, which have been published, give one ground for surmising that although there are some authorities who are inclined to take a gloomy view as to the possibility of maintaining the present output, still there are others who have few doubts on the subject. There are two

¹ See Appendix.

problems: (1) the continued production of this huge quantity annually, and (2) producing at an economic price. It would appear that cheap coal, as we knew it in pre-war days, is a thing of the past. The future alone can show whether this will give oil its opportunity, and whether given the opportunity, oil will be able to meet the demand in quantity and price. It would seem that there will be a growing proportion of oil produced from shales and coal, since authorities seem to agree that oil in the liquid form will probably be more and more difficult to obtain. In the interests of the commerce of the world, it would be satisfactory if there were some healthy competition between rival fuels. Anything like monopoly, as sad experience has shown, might from time to time have disastrous effects on world trade.

With increasing demands the monopolists, who control to so great an extent the oil supply at present, have been able to raise prices.

Great Oil Fields.

The great extension in the use of motor vehicles of all descriptions, operated by private people of all ranks and road transport agencies, has been another great advantage to the oil rings, and prices have been maintained at a very high level in spite of protests by consumers, and various efforts which have been made to create competition. But the whole civilised world is now awake to the importance of the fuel supply, whether it be in the form of oil, coal, or shale. It is an ascertained fact that in Eastern Europe there is a great area whence oil can be produced, and this area adjoins the areas already worked in that part of the world. Nor is this field limited in its extent to one country. It runs apparently with but few breaks across Persia, where Englishmen have obtained valuable concessions, through India, and probably the richest area of all is yet to be tapped in China. For it is known that the field runs eastward to the Pacific, and the opinion of some experts is that China will become a great oil-producing country. To the south of these regions both oil and coal are known to exist in great quantities, and in Burma and in the Malay Peninsula, only to mention those out of many lands where there is now no doubt as to the value of the fuel resources. Reference has already been made to the oil produced by the United States of America. The value of this has set the geologist and miner to work both in the north and in the south. In Canada it is expected that the oil

available will be as rich in quantity as that in the neighbouring States, whilst in Nova Scotia, New Brunswick, the West Indies (notably Trinidad), and throughout a great part of South America, there is sufficient evidence to warrant the assertion that oil in quantities capable of paying for production on a large scale, will eventually be available. Oil then, in the fluid state, is now known to exist in large quantities over widely-stretching areas of the world. That these oil fields will be worked, the present activity of the oil mining market abundantly proves. But flowing oil wells sometimes run dry, and a big demand might exhaust the oil from even so great an area as has been indicated. Against this fear, as has already been pointed out, there are other possible sources of supply, nor have these hitherto been more than slightly utilised.

There are few countries and continents that do not contain areas of bituminous shale. That it was possible to distil illuminating oil from this was discovered in the early part of last century, but until James Young, about the year 1850, took out a patent for distilling paraffin from

**Oil Obtained
by Distillation.**

coal, no commercial advantage was made of the invention. Some shales will yield as much as 50 gallons of oil from one ton, and the oil can be further manufactured into gas, spirit, illuminating and lubricating oils, with varieties of heavy residuals, which can all be utilised. Young's efforts resulted in developing an important industry in Scotland, and at the present time in Scotland alone several million tons of shale are treated annually. This industry is, however, still in its infancy, and is capable of almost indefinite extension, for valuable areas of bituminous shale have been discovered in Australia, in New Zealand, and in South Africa, nor is this by any means the whole extent of the world's resources. Scotland has rich supplies, and shales are also found in parts of England; indeed, in almost every part of the world there are either shales, clays or coals of various qualities, whence oil can be distilled. Some of these might not be commercially profitable to work, but there are experts who are of the opinion that the resources of the world whence oil can be distilled are considerably greater than the resources of fluid oil. Coal itself would, under well organised conditions, be considerably more economical to use if it were analysed into its component gases, spirits, oils and residuals, instead of being crudely consumed in a furnace, where much that is of

value is wasted. If coal were rightly utilised, our coalfields would enjoy a longer life, and yet be capable of rendering increased services to mankind.

As against the use of oils distilled from various shales and clays, it is alleged that some of them contain a percentage of sulphur, which is harmful in some of the purposes for which the oil may be employed. Here is a disadvantage for the Chemist to rectify, nor can it be doubted that sooner or later experiment and experience will overcome this defect. Meantime, there are ample materials whence oil, free from these impurities, can be distilled.

**A Problem for
the Chemist.**

The total world production of mineral oil, as has been noted, is about 140,000,000 metric tons, but this has to be refined before it is available either in the form of petrol for motors, paraffin for lighting, or the heavy oils for engine purposes. The vessels belonging to the war and mercantile navies of the world now fitted to consume oil fuel make a big demand on this total production. Moreover, an increasing number of these vessels annually are using oil either as fuel to raise steam, or in the internal combustion engine. Thus superficially it would appear that, other conditions remaining fairly constant, the price of oil should rise perhaps to a point at which its use becomes commercially less attractive. As against this there is the feeling of unrest among the coal miners not only in Britain but in other countries, notably America, which is having the effect of raising the price of coal perhaps permanently. If, however, one takes stock of the world's resources of oil, and notes how the growing demand for oil and its various constituents has increased the production, there is good reason for believing that in a not very remote future, should the shipping¹ managers of the world decide on operating a larger proportion of their vessels with oil, the quantity required will be forthcoming at a reasonable price. Since the year 1901, the production of oil has increased more than sixfold. In that year the quantity produced was only a trifle over 21,000,000 tons. If this increased production can be maintained, the time when oil may entirely supplant coal at sea may not be very far off. And be it noted, this figure only includes oil produced in the fluid state; the quantity that could be distilled from coals and shales has not been estimated,

¹ Cf. Appendix.

but undoubtedly it is very great. Increased demand and the economic conditions of the various spheres of transport will render this further supply available in due course.

One cannot insist too emphatically on the point that when the facts are proved, the country that is the first to utilise oil on a large scale for shipping purposes, will have an enormous advantage over any competitors who lag behind. The courage of English shipowners on a previous occasion, when the issue at stake was the same, and the hazard was even greater, namely, in scrapping hundreds of thousands of tons of obsolescent steamers, when the Suez Canal was opened, and the fact that their successors remain in the forefront of the ocean-transport industry, are the warrant for drawing the conclusion that the shipping interest of this country will not miss the present opportunity.

The chief obstacle at present hindering the more extended use of oil, either in the furnace or in the cylinder, is its price. This will

Danger of Monopoly.

continue so long as the sources of supply are limited, but with the area of supply continually extending, the ordinary competition of trade should make the

organisation of a monopoly in oil increasingly difficult either to arrange or to maintain. Some of the principal areas, too, are outside private control. The Governments of the countries where the richer supplies either of oils, shales, or coals exist, have an added responsibility, of which they are in most cases fully aware. It is incumbent on them to make it absolutely impossible for any syndicate, however powerful, to obtain, or to continue to enjoy, a monopoly over the sources of power. For, rightly employed by a community, these may do much to assist its progress and development—indeed, the future belongs to the progressive people who not only possess these resources, but develop and use them aright.

Even as things stood when conditions were normal in 1914, it was calculated that in an efficient internal combustion engine, oil,

Need for Skilled Experts.

though the price rose to as much as £6 per ton, would show a saving over reciprocating engines driven by coal at its then price. But with in-

creased production taking place over a greater area, the tendency should be for prices to fall. There are experienced oil experts who do not hesitate to assert that when the industry gets into its stride, large quantities of cheap oil will be readily available for all purposes,

including the supply of shipping at suitable oil stations on all routes. In order to bring this about at the earliest possible moment, the first need is that suitable men should receive a practical scientific training in oil mining and refining. So far as the British Empire is concerned, our resources are said to be ample for all purposes, but our supply of skilled men is ridiculously small. As a matter of fact, we have hitherto lamentably neglected this part of our resources, and where the British oil fields are being exploited, and where British capital is developing oil-bearing areas in other lands, the management has, to a very great extent, to rely on the advice and skill of experts from either America or Eastern Europe. To such an extent is this true, that we are in the dangerous position of having our supplies worked by men whose real interests may lie in an opposite direction. Our first duty here is to train British citizens for the purpose of developing our fuel resources. At present only one University in the United Kingdom feels its responsibility in this matter, and has definitely organised a system for training experts in oil mining and refining. There should be similar training available in every University in the Empire.

In conclusion, the urgent need for attending to this important sphere should be emphasised. There is the question of holding our own in the realm of international trade and commerce. But this is a narrow and limited part of a far-reaching question. It is not overstating the case to say that our position among the nations of the world, and the healthy, social and industrial development of the Empire as a whole, depend to a very great extent on how we tackle the problem of the exploitation and utilisation of the fuel resources, *the power resources*, of the Empire. The possibility of England, and all that England stands for, being content with a lower position, when Providence has endowed her so richly in these respects, that she may not only hold her own, but continue to lead the world in all that is best and highest, would not only mean the extinction of one of the greatest civilising forces so far known in the world's history, but would inevitably result in a serious setback to world-wide civilisation.

Britain and her Fuel Resources.

CHAPTER IV

MODERN OCEAN TRANSPORT

TO-DAY, with the exception of the areas included in the Arctic and Antarctic regions, it is possible to go, or to send cargo to almost

General. any part of the world, making use of the ocean route

wholly or mainly, with a maximum of economy, and at a minimum of trouble or danger. The question of the land road or the water route, already referred to as one of the oldest problems facing mankind, is likely to remain a living question, to the end of history. In every continent railway systems of growing importance, and offering varied facilities for travel and transport, which in some cases may compete with, but in all, must complement, the sea-services, give an ever increasing completeness to international and inter-continental communication.

There are now air services which, although in their infancy, already supply many conveniences for passengers, mails, and for the transport of light articles. Thus completeness is being still further augmented, nor does it require much prophetic vision to foresee these services crossing continent and ocean in all directions, supplementing facilities in connection with the commercial machinery. As a consequence, there should be an additional impetus to international trade and exchange, and it may be hoped that artificial barriers and regulations impeding free interchange of goods and services may, as a result, tend steadily to diminish.

The land road, however, is subject to special chances of interruption. Only in very exceptional cases, for instance, North

America, do the transcontinental railways pass

Land and Water Routes. through a country the whole of which is subject to one Government. The passing of frontiers or of

Customs barriers opens up the possibility of international friction. The consequences of the latter have been patent ever since the Turk interfered with the land route to the East many centuries ago. The sea route, on the other hand, has always enjoyed a greater freedom ; and so presumably will the air route. It is true that rival nations have war-ships that may on occasion very seriously interfere with

the international commerce, but whereas the railroad is fixed, and the stoppage of trains becomes merely a matter of massing sufficient force at one point, the ocean and air routes are so widespread that even the blockading of a single coast or frontier has been found to entail very great, if not insuperable, difficulties, whilst the stoppage of world trade on a large scale is well-nigh unthinkable.

In other words, wherever it is possible, the water route under modern conditions is not only the cheaper route for the transport of

Balance in Favour of Water Route.	goods, but, given a good ship, is more reliable and safer under a variety of conditions—economical, social, or political.
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During the past century, international exchanges have increased so greatly, both in the bulk and in the variety of the commodities

Specialised Ships.	exchanged, that very special arrangements have been made to cope with the various grades of goods.
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At one time the type of ship was simple ; indeed all ocean-going ships might almost be placed in one of two classes. But to-day the various types of ocean-going ships are very numerous, almost each trade employing a vessel specially designed to carry on the work of that special trade with the maximum of convenience and economy.

Mail Service.	Thus the mail and passenger service of the North Atlantic has resulted in the evolution of the Atlantic Greyhound, a ship of great tonnage ; the greatest at present employed in any trade.
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In the history of international exchange, there have been developments, either gradual or sudden. The latter due to discoveries, and the radical changes wrought by discovery on the one hand, or the ingenuity of man on the other. As instances of these changes, it may be mentioned how with greater skill in seafaring, more correct instruments, and increasing scientific knowledge, ships were enabled to make longer and more venturesome voyages. In the course of these, new trades were invariably created. The discoveries of men like James Cook gave a sudden impetus to trade in new directions. Similarly, radical changes in the routes traversed by commodities transported between different parts of the world occurred when Vasco da Gama discovered the sea-route to India, and ships were enabled to carry cargoes direct to and from the Far East, without

Development of International Exchange.	
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any necessity for transshipment; and in our own time, when Ferdinand de Lesseps opened a waterway through the Isthmus of Suez, so that much of the Far Eastern trade has returned, under novel conditions, to the old world route.

When modern commerce commenced, an event which is by many authorities made to coincide with the discoveries of da Gama and

**The Old Barriers
of Suez and
Panama.**

Columbus, there were two serious barriers in the way of an all-round-the-world route. Owing to the fact that both at Suez and at Panama there was an Isthmus unpierced by Nature, ships, on arriving at either of these points, were confronted by an impassable barrier, a very definite terminus. Vessels from Europe whose destination was either the Far East or some point in the Eastern Pacific, had to make a long detour, in the one case round the Cape of Good Hope, and in the other round Cape Horn. Even ships from the east coast ports of North America must round Cape Horn in order to reach the Pacific, whence it came about that there was but a slight difference in the mileage to be run in a voyage from either London or New York to ports on the west coast of America, for from London to Callao round the Horn is 10,013 nautical miles, whilst from New York the distance to be traversed is only 325 miles less. The advantage of a waterway through these barriers was early realised. Indeed, at Suez, there was a canal suitable for the passage of small craft many centuries ago, but long ere the modern era dawned, this had silted up, nor was it until Napoleon was endeavouring to drive the English out of India, and as a first step was preparing to occupy Egypt, that a modern attempt to construct a canal at Suez was suggested. Napoleon's engineers, however, reported

Suez Canal.

against the scheme, believing that the difference of water level at Alexandria and Suez would prove fatal to a successful enterprise. But shortly after the Napoleonic period, a young Frenchman, Ferdinand de Lesseps, who was Consular Agent in Egypt during the 'thirties of last century, conceived a project for piercing the Isthmus. By dint of indomitable courage and perseverance, he carried through his great design, in spite of the opposition of some of the leading statesmen of Europe, notably Lord Palmerston and Lord Stratford de Redcliffe, and in the year 1869, had the satisfaction of seeing his waterway opened to the shipping of all nations. The comparatively small cutting of 1869

has been developed into a fine ship canal, having a depth of 42 ft. 8 in., and a minimum surface width of 240 ft., capable of accommodating the fine vessels now linking East and West.

The new route to the Far East effected a saving in distance of from 3,000 to 4,500 miles ; for instance, from London to Bombay

Effect of Suez Canal on Eastern Trade. by the Cape is 10,700 miles, but via the canal it is only a little over 6,200 ; the voyage to Yokohama has been reduced from 14,300 to 11,100 nautical miles. If the freight for carrying 1 ton of goods 1,000 miles by steamer be reckoned at from 2s. 6d. to 3s.,¹ the saving effected on the present tonnage passing from East to West, and vice versa, mounts up to a very considerable sum annually. In other words, the opening of the new route has been a most important factor in fostering and developing trade. Nor is it the terminal ports alone that have benefited. The Suez Canal opened up many new possibilities for trading, for there is a series of conveniently situated trade centres all along the route. Before the canal was opened, either the trade of these ports was curtailed, or English ports had served as distributing centres, and cargoes had been subjected to transshipment and rehandling, which had again led to increased cost for transport. Thus to estimate the full economic effect of the work of de Lesseps, there are a number of factors that have to be taken into account.

Growth of trade always necessitates the employment of new methods. Nor could this axiom be better illustrated than by commercial history since 1870. Western Europe

Rise of Germany. enjoyed a long period of more or less profound peace. The peace was sufficiently secure to enable continental nations to develop their commerce to an extent that was not possible under the conditions existing during the first half of the nineteenth century. Germany has become a great manufacturing and commercial unit since 1870, and the Mediterranean ports have attained an importance they had not known since the days of Portuguese commercial expansion. Hence with or without the Suez Canal the English *entrepôt* trade must have been eventually affected. As soon as there is sufficient regular trade from a given trading centre to warrant a regular ocean transport service, that service will be instituted. This is the main explanation of many a

¹ Cf. *British Shipping*, p. 347.

modification that shipping business has experienced during the past forty years. And during the last five or ten years, more especially, this tendency has been increasingly marked. The creation of *free ports*, too, has had its effects on modifying the great position enjoyed for so long by the English ports, thanks to *free trade*.

The Suez route to the Far East is only suitable for self-propelled vessels. Thus the year 1869 sounded the knell of the sailing ship in the Indian and Chinese trades. But the utility of the sailing ship continued for nearly three decades longer, and it was mainly sailing vessels that opened up, and were instrumental in the early development of, the trade with Australasia, and the west coast of America.

The barrier at Panama, too, has at length been pierced and is now available for ocean-going vessels of all sizes. At present one can but estimate some of the possible effects of this new route. From the experience of what has

been effected by the piercing of the Isthmus of Suez, it will require two or three decades at least to make plain the full effects of the latest French and American enterprise. Probably the greatest effects for some time to come will be local. The West Indies and the West Coast countries and provinces of North and South America will reap the first great benefits from the economic point of view.¹

As the nineteenth century developed, the trading routes of the world gradually settled down into well defined grooves. In the first instance this was the work of England and the United States, then for a time England continued

the work alone, but more recently there has been a world-wide awakening on questions of transport, and at the present moment, practically all the progressive nations are doing their share in modernising and in improving the services which keep the whole world in commercial relation. The most active maritime nations to-day are England, the United States, Germany and Japan, but some of the less observed nationalities are doing very effective work.

As an illustration of how, under modern conditions, a new trade may be created, the development of shipping services between Europe and Western Australia may be taken. A little over forty

¹ For a detailed discussion of this question cf. "Some of the Economic Effects of the Panama Canal." *British Shipping*, pp. 397-453.

years ago this trade was in its infancy. Two comparatively small London shipping firms began sending a few small vessels to Western Australian ports. These ships, measuring from 500 to 700 tons, at first, with some difficulty, picked up a cargo by visiting several small ports. Then in the year 1884, a small steamer was purchased, and a coasting service was commenced, which included all the Western Australian ports, and extended as far as Singapore. The trade developed, and in a comparatively short time, a new steamer was built for the service. From that time, Western Australia has experienced a remarkable growth in commercial importance, and the trade is now sufficient to attract the services of several shipping companies. The sailing ships have done their work, and the trade is now carried on, so far as the original firms are concerned, by several first-class cargo steamers. This briefly sketched description is typical of what has been going on wherever mankind has discovered trading possibilities. The small vessel has begun trading in a tentative way with some new colony or settlement, and it may safely be said that where the community, however small, has been imbued with the progressive spirit, development has been steady. The usual sequence is that larger sailing ships have succeeded the original smaller craft, then steamers have been put on the service, and, finally, the sailing ship has been superseded, until now, in practically all trades, she is a negligible quantity. To-day, there is hardly a seaport, however small, that is not either directly or indirectly served by up-to-date steamers.

To understand the main routes along which at present the great ocean services run, it is necessary to take a bird's-eye view of international commerce. There are definite centres where the great mass of exported manufactured goods is produced. These centres are densely populated, and the countries where they are situated, are with the exception of the United States of America, unable to produce their own food supply. Moreover, in addition to demanding ever-increasing supplies of food, they require a vast amount of raw materials of various descriptions. There are other and more widely scattered areas where the food supply for the densely populated countries, and the raw materials required to keep loom and spindle, converter and rolling-mill employed, are produced.

**Development of
Shipping
Services.**

**General View of
International
Commerce.**

There is also the commodity which to so great an extent dominates shipping business at the present day, namely, fuel. As long ago as the year 1898 a well-known Liverpool shipowner estimated that the coal exported from the United Kingdom amounted to no less than ¹ 86 per cent. of the total tonnage of exports. Our coal exports showed increasing figures till 1912, since when there has been a remarkable decrease, indeed, with the exception of the year 1923, the figures are considerably below those of pre-war days. This is due to many causes, not the least of which is that other countries have developed their fuel resources, and not only in many cases supply their own needs, but export in competition with us. There is also the present increasing use of oil as marine fuel. Our own navy is now oil driven, and mercantile owners are beginning to favour this type of fuel.

The great manufacturing centres of the world at present are North Western Europe and the Eastern States of North America. The food-producing countries are America (North and South), Australasia, the Far East and Eastern Europe. The main sources for the supply of raw materials are North Western Europe, the Americas, Australia, New Zealand, the countries of the Far East, and parts of Africa. The great coal exporting country has been the United Kingdom; the countries now supplying other parts of the world as well as themselves with coal are Australia, South Africa, Japan, India, Germany, and the United States. Bearing in mind the above points, and especially the great amount of coal still leaving the shores of the United Kingdom in normal times, it is

The Two Great Shipping Points.

easy to see why there are two great points at which a great mass of shipping is continually passing and repassing, and that there are numerous points where shipping routes divide as vessels separate in order to reach their several destinations. The two main focusing points are, first, the entrance to the Atlantic from North-West Europe, lying between Ushant and the South of Ireland. Here is focused the principal part of the import and export trade of Western Europe—that of the United Kingdom, France, the Netherlands, Germany, and Scandinavia. These countries, taken together, own the great mass of ocean-going tonnage. And this stretch of sea leads directly to the principal European seaports, where the

¹ Cf. *Our Foreign Trade in Coal*, D. A. Thomas, p. 11.

commercial and manufacturing industries of the Old World are concentrated.

The second of the two great points stretches from Cape Race to Long Island, for along this stretch of sea passes the greater part of the shipping which trades between the great ports of North America and Central and South America, and Europe.

The lesser points at which shipping congregates, but to separate, are for the Far Eastern and Australasian routes via the Suez Canal, the Straits of Gibraltar, Aden, Colombo, Singapore and Yokohama ; for the South American trades, Madeira, the Canary Islands and Cape Horn ; for West and South Africa, and for Australasia via the Cape of Good Hope, Madeira, the Canary Islands, and the Cape of Good Hope. With the opening of the Panama Canal, there may come into existence another great point of concentration at Panama. This route, too, has a series of points marked by the principal islands of the Pacific Ocean where shipping routes divide ; these lesser points may be expected to grow in importance if the trade developments which are expected to result from the opening of this new waterway become concrete facts. A modern steamship is free of the ocean, and if she be of moderate tonnage can trade between practically any ports. Large steamers are restricted

in their trading radius by physical obstacles on certain routes or at certain ports which limit the measurement of shipping that can participate in the trade. But with this exception the steamer is a much freer agent than the railway train, which is limited to rails of one gauge, and practically to a very circumscribed area of the earth's surface. The railway must have its termini and its important centres. There is no such necessity connected with the shipping industry. Indeed, one of the remarkable developments of modern times is the decreasing necessity for terminal ports, *i.e.*, ports where shipping companies have definitely fixed their headquarters, and where the vessels naturally go to refit, and to commence their new voyage. It is estimated that at least 20 per cent. of the shipping tonnage belonging to the United Kingdom trades permanently abroad, linking up various foreign ports and performing services of transport entirely for foreign clients. There is a grain of comfort in this for those who look forward to the time when the British Islands may have ceased to be the great importing and exporting

**The Steamer
a Free Agent.**

centres, for the shipping interest can maintain itself so long as it is able to offer an economic advantage to shippers of goods.

The success of the Panama Canal may emphasise this tendency, for it may probably lead to the institution of all-round-the-world

**All-round-the-
World Service.**

services; liners continually steaming in one direction, merely stopping at convenient ports for the purpose of taking in and discharging cargo and passengers, or for bunkering and repairing. If this come to pass the shipping of the United Kingdom, under the present organisation, which includes several important combines, should be in a better position to benefit by the Panama route than that of any other country.

CHAPTER V

SHIPPING REGULATION AND MANAGEMENT

UNTIL the middle of last century the shipping of this country was regulated by the Navigation Acts. This famous corpus of legislation had commenced in Plantagenet days for the purpose of fostering the shipping interest. Under Cromwell the policy had been thoroughly overhauled and brought up to date. Indeed, by means of the Commonwealth legislation a severe check had been administered to the Dutch, and the foundation of England's mercantile supremacy on the sea had been securely laid. From that time until the year 1825, the policy continued in force. Then all laws regulating shipping were repealed by Parliament, but by an Act of that year the policy of fostering shipping was continued. The prevailing sympathy with non-intervention in trade matters by the State led to the repeal of the Navigation Law in 1849, and in 1853 even the coasting trade of the United Kingdom was thrown open. At first it seemed as though America would follow the generous example set by England, for within four months of the repeal of the English Navigation Law, the United States Government relaxed its restrictions to the extent that foreign ships were allowed to take part in American foreign trade. The coasting trade, however, was jealously restricted to American ships, and as coasting trade was loosely defined as trade between any two ports belonging to the Union, what was of comparatively minor importance three-quarters of a century ago, has become radically different since the United States first developed enormously within its own frontiers, and then became a world power. To call a voyage from New York to San Francisco *coasting*, required a sufficient strain to the imagination, and when that dictum is extended to include a voyage between an American port and Manila, one's imagination altogether refuses to respond; but in actual business, this absurd regulation is enforced.

With the opening of the Panama Canal, an attempt was made to accord privileges to certain classes of American vessels. Great Britain, however, lodged a protest that this constituted a violation

of the Hay-Pauncefote treaty, and as a result in June, 1914, the attempt was definitely abandoned.

So far as the British Empire is concerned, shipping business is for all practical purposes free and open to all comers. There are two restrictions but they apparently remain in desuetude, namely, that the trade from any one part of a British possession in Africa, America, or Asia, to another part of the same possession, can only be carried on in British ships, though by Order in Council, the Crown has the power, if petitioned to do so by any possession, to relax this regulation; and free intercourse may be confined to such nations as consent on their part to concede equal freedom to British vessels.

**Free Shipping
within the
British Empire.**

For, by the 16 & 17 Vict., c. 107, ss. 324-326, it was enacted, that if British vessels were subjected in any foreign country to any *prohibitions* or *restrictions* as to the voyages in which they might engage, or the articles which they might import or export, her Majesty might, by order in council, impose corresponding prohibitions and restrictions upon the ships of such foreign country; and further, that if British ships were directly or indirectly subjected in any foreign country to *duties* or *charges* from which the national vessels of such country were exempt, or if any duties were imposed there upon articles imported or exported in British ships, which were not equally imposed upon the like articles in national vessels; or if *any preference whatsoever was shown*, either directly or indirectly, to vessels of such country over British vessels, or to articles imported or exported in the former, over the like articles imported or exported in the latter; or if British trade and navigation were not placed by such foreign country on *as advantageous a footing as the trade and navigation of the most favoured nation*, then, and in any of these cases, her Majesty might, by order in council, impose such duties of tonnage upon the ships of such foreign nation, or such duties on goods imported or exported in its ships, as would countervail the disadvantages to which British trade or navigation was subjected. And these provisions still remain substantially in force, notwithstanding that the Act 16 & 17 Vict., c. 107, has been now in great part repealed.¹

By the Merchant Shipping Act of 1894, British shipping law was consolidated into one Act. This Act² has since been extended or amended as might be necessary to meet changed conditions. It is one of the great functions of the Board of Trade³ to administer these Acts. That this duty is no sinecure will be realised from the following list,

**Board of Trade
and Shipping.**

¹ *Stephen's Commentaries of the Laws of England*, vol. iii, pp. 155, 156.

² For present state of the law, cf. *The Shipping World Year Book*. This gives annually a digest of Acts in operation.

³ For a detailed account of the Board's duties, cf. *British Shipping*, p. 261.

which gives some of the principal matters dealt with by the Marine Department of the Board of Trade—

The registry and measurement of ships.

The survey of ships' equipment, including life-saving appliances.

Responsibility in connection with various goods that are carried.

The load-line and general seaworthiness of ships.

The examination of all candidates for positions as ship's officers, either on deck or in the engine-room.

Responsibility for passenger and emigrant ships.

As to seamen and firemen, the Board supervises their engagement and discharge, and protects them from crimps, and will, if desired, take care of their earnings.

The inspection of provisions and the granting of certificates of efficiency to cooks.

Enquiries into wrecks and casualties at sea.

The testing of anchors and cables.

International conventions as to safety of life at sea, the unification of maritime law and signals.

This list could easily be extended, but it gives the main points, and shows the inclusive nature of the responsibility of the Board

Pilotage. and its officials, a responsibility which continually tends to increase. The Board of Trade, too, is by the Act of 1913, the responsible authority for pilotage throughout the United Kingdom. It also controls the Trinity House, which undertakes the important duty of lighting and buoying our coasts and channels. Thus Government control over shipping in all its main and subsidiary branches is fairly complete.

There is also a semi-official control that is almost, if not quite, as important to shipping as that of the Government. This is a control that the shipping interest has evolved for itself.

Lloyd's Register. It originated in connection with marine insurance, but has developed until it embraces not only the designing and building of a vessel, but controls the manufacture of the materials that will be employed in the work of construction: it also holds periodical surveys during a ship's existence for the purpose of classification. This work began with Lloyd's Register, an outgrowth, but an independent institution from Lloyd's

Association of Underwriters, which came into existence during the seventeenth century. To-day the work of registration and all that it entails is carried on by several institutions, the principal of which, however, are Lloyd's Register of British and Foreign Shipping, the British Corporation, and the Bureau Veritas. Theoretically a man may build a ship to his own design and plan ; in practice, the great corporations for the Registry of shipping have drawn up regulations based on long years of experience and scientific knowledge, and the designs of all ships now built are submitted and passed by a Registry before the work of construction commences. Without a class a ship would be unable to obtain either cargo or passengers ; nor if these difficulties were overcome would it be possible to effect an insurance upon either ship or cargo. The semi-official control then is very complete, and as effective as that exercised by the State. Indeed, so far as certain important matters are concerned, the State and these Corporations work together, the State utilising the special knowledge and facilities of these Corporations to carry out control that otherwise could only be exercised with great difficulty, and at great expense.

Not the least important development of recent times in connection with world shipping is the tendency towards international agreement on all important points affecting life and property at sea. Here again both Governments and the shipping interest itself are working towards a common end. Governments are feeling their way towards a uniform code of maritime law dealing with every sphere of the industry, whilst the shipping interest, through its conferences, is aiming at a simplification of the details of shipping business by means of standard forms for charter-parties, bills of lading, insurance policies, and the many other documents as to which a dispute in a foreign land may cause so much irritation or loss.

International Agreement.

THE MANAGEMENT OF SHIPPING

Few industries have gone through such continuous and radical changes as has shipping. The small ship might easily be owned, managed, and even navigated by one man. This was frequently the case with the *Free Trader* of a century ago. But with the great growth in the volume of international trade, necessitating a larger and more

Changes in Shipping.

expensive vessel, run on modern lines, entailing a maximum of efficiency and economy, the day of the private owner came to an end. Shipowning always has been essentially a rich man's business, and in spite of limited liability, and the possibility of dividing-up share capital into units of £1, it is true to say that shipowning remains a rich man's occupation. As an investment shipping shares are best avoided by people of moderate means, unless they are in some way connected with the industry and have some inside knowledge.

So far as manufacturing industries are concerned, the Industrial Revolution marks a more or less sudden break between old and new methods of organisation, the purchase of raw materials, the marketing of the finished product, and the relations between the management and the labour employed. But with shipping the changes during the past century have been almost continuous ; there has been one long stage of transition. Many of the changes have been epoch-making, and nearly all have required a radical alteration of method which has tested the business ability of shipping managers in a most exhaustive manner. Not only has steam superseded sails as the propelling force—a change that necessitated a new intellectual equipment in the men responsible for managing ocean-going vessels—but the submarine cable worked a revolution equally drastic. Nor do these two great events sum up the whole matter, for each trading country has been developing on different lines, routes have been changed, new and unthought of possibilities have opened out. In a word, the kaleidoscopic nature of the changes has been so complete and far-reaching that there has been a constant demand for the new man, mentally equipped to face constantly changing conditions. The old shipping firms in many cases have been either renewed with outside blood, or have gone under ; there has been in the forefront of the industry a continuous change in the personnel responsible for the main interests.

By merely looking at shipping as carried on to-day, it is difficult to realise the full extent of the revolutions which have taken place in every sphere of the industry. But if one thinks of the comparative simplicity and even sluggishness of the sailing ship days in the first half of last century, and compares that picture with the complicated

**One Long Stage
of Transition.**

**Greater
Responsibility of
Management.**

mechanism of the industry as carried on to-day, including in the study, steam, electricity, refrigeration, new constructional materials, the extended and complicated technique of markets, shipping institutions, conferences and routes, one gets at least a glimmering of what has occurred, and is able to realise the great drain on a man's mental resources when he is responsible for the management of a line of steamers. The owner of a small *Free Trader* ship, three-quarters of a century ago, had a comparatively easy task. His chief care was to obtain in the first place, the services of a capable, business-like captain, for on him almost everything depended when the ship once left her terminal port ; and then he had to be careful in selecting honest agents at the ports of destination. For when once a ship sailed on a voyage, which might last two or three years, the owner's control was reduced to a dangerous minimum. He could, it is true, lay down the main principles to be followed by his servants and agents, but it was the man on the spot who had to act, and on his decision would, to a great extent, depend the success or failure of the voyage. A shipping voyage is known as a venture.)) The word is still adequate in describing the chances of shipping business, but in the days before the submarine cable gave the owner complete control over every transaction, it more justly and fully expressed the situation. The owner in the old days might worry, but he could not fully control. Compare his position and responsibility with those of the manager of a modern tramp steamer. The latter not only needs to know the main facts about steam, fuel, constructional materials, and the many items of knowledge, which are necessary if he is to keep the vehicle he employs abreast of the times ; but he must know the exporting and importing centres of the world and the commodities available at or for each. He must keep his finger on the pulse of many markets, know when the crops have failed in one part of the world, and have been above the average in others. He must be watchful and on the alert, so that his ship or ships may be where they are wanted at a given moment, and not side-tracked when there is a boom with consequent high freights. The successful tramp owner must be a many-sided man, knowing just a little more than his average competitor. This little bit of extra knowledge can only be obtained by the *sweat of one's brain*, but it pays handsomely, and earns the gratitude and confidence of shareholders. Such a

man knows but little peace. He must not miss a single item of news connected with markets, freights, crops, and production. This type of man is not common ; he has evolved, and is no sudden creation. How he has evolved can be traced by studying the development of the shipping industry through the stages marked by changes in ownership, management, and in the type of ship operated.

The liner and the tramp of to-day roughly represent the charterer's company's vessel and the *Free Trader* of long ago. The *Free Trader*

The Liner and the Tramp.

might belong either to a single owner or to a partnership. In the eye of the law a ship was looked upon as consisting of sixty-four parts, and so long as there was no further subdivision these sixty-four parts might be registered in the names of any number of owners from one to sixty-four. The liability of the several owners was limited under the Merchant Shipping Acts ; thus even after the introduction of limited liability trading, the sixty-fourth system continued to exist, but the advantages of trading under the newer system have increasingly attracted shipping managers. In the last number of *Fairplay* for the year 1913, the last normal pre-war year, a table is given of ninety-eight cargo ship companies, with particulars of their capital, their book value and gross tonnage of their steamers, the profit or loss made during the previous twelve months, the dividends paid, and the amounts transferred to depreciation accounts. This table shows that out of the 98 companies, 19 owned only 1 vessel, 10 owned 2, 8 owned 3, 11 owned 4, and there were 28 companies operating with from 5 to 10 vessels, 11 with from 10 to 15 vessels, 5 with from 15 to 20 vessels, and 3 with 20 vessels or over. The smallest of the companies was working with one steamer of 1,533 tons gross measurement, on a paid-up capital of £8,460 ; whilst the largest company under review owned 36 vessels of an aggregate gross tonnage of 127,596, on a paid-up capital of £499,570. On a total capital of £10,964,108, an average dividend of 12·56 per cent. was paid, whilst £3,344,643 was transferred to depreciation accounts. Some of these companies were doubtless doing regular cargo-line work, but the majority of the ships were tramps. It is not easy to differentiate between a liner and a tramp, indeed, the distinction is rather in the management than in the vessel. The great mail and passenger steamers are liners, and except when one of the

may be employed temporarily on yachting cruises, and so becomes a *passenger tramp*, there is no doubt as to the class to which they belong. The cargo tramp pure and simple, too, is easily classed. She is a handy-sized vessel, capable of visiting a large number of ports and of being employed in many different trades ; thus she is ready to go where there is money to be made. But there are a large number of cargo steamers employed regularly in various trades, and these should rather be called *cargo liners*. It must be remembered, however, that a steamer may be a liner for a period more or less lengthy, and then do tramp work, and *vice versa*. In common parlance, a steamer that goes anywhere and is prepared to accept practically any kind of freight offering is known as a tramp. It is this vessel that is the thorn in the sides of those shipping managers who have, perhaps after years of struggle, succeeded in developing a regular trade between two countries. When things are bad and freights are low, they are left in peace to carry on what little business there may be, but when good times come and there is a prospect of making money, the tramp appears upon the scene, and frequently contrives to spoil the market for all interested parties. It is the ubiquitous character of the tramp that has been one of the main factors in bringing shipping conferences into existence.

The modern tendency towards even greater units in the business world is fully exemplified in shipping. The small shipowner still flourishes, and it is well that he should continue to do so, but for the most part he is a new man, and with success his unit grows either by natural development or by combination. It is to a great extent the continual appearance of new men in the industry that has kept shipping up to date. The new man is naturally venturesome and ready to try new methods which give promise of an advantage over older methods employed by those amongst whom he is attempting to gain a footing. It is almost from the first his great aim to become the head of a regular line, indeed, many instances could be quoted where the owner of one small cargo-steamer employed in tramping has by perseverance and success in the first instance, and then by doggedly working at the development of one trade, built up a great liner company.

The policy of combination which is so much in evidence at the

New Men in the Shipping World.

present moment, is more easily traceable in the liner companies than among tramp owners, if only for the reason that the large

combinations of capital and tonnage consequent on liner amalgamations are events of public importance, and are much discussed and criticised by the ordinary daily press. One instance of combination which occurred on the eve of the outbreak of the war, that of the Peninsular and Oriental and the British India Steam Navigation Companies (June, 1914), is a case where two old and firmly-established shipping firms decided to join forces in order to present a united front, not only to British but also to threatening foreign competition, and there have been further developments of considerable importance during the past twelve years. For instance, in June, 1916, this combination effected an amalgamation with the New Zealand Shipping Company and its associate, the Federal Steam Navigation Company. In 1917, the P. & O. Company acquired a *representative interest* in the Union Steam Ship Company of New Zealand. Shortly afterwards this was followed by the purchase of the Hain and Mercantile Steamship Companies respectively, and a line of steamers belonging to Messrs. Nourse, Ltd., running between Calcutta and the West Indies. In 1918, this group was further strengthened¹ "by closer association with the Line which had for many years alternated with the P. & O. Service in maintenance of the weekly mail transit to and from Australia." The following year, the Australasian United Steam Navigation Company, a subsidiary of the British India Company, acquired control of the steamers and trade of the Eastern and Australian Steam Navigation Company, which carries on a regular service of steamships between Australia, China, and Japan via Manila. During the same year there was included within the same group, the Khedivial Mail Steamship and Graving Dock Company, by means of which the trade of the Levant and a series of Red Sea ports became linked up with the trunk-line routes of the Federated Companies, and, lastly, there has been added to this group the General Steam Navigation Company, one of the oldest of British steamship firms.

Another equally interesting instance of amalgamation and identification of interests is the Royal Mail Steam Packet Company and its adherents. This Company was established by Royal

¹ P. & O. Handbook, p. 11.

Charter in the year 1839. During fairly recent years it has obtained a controlling influence in the—

Pacific S.N. Co.	Mac Andrews & Co.
Nelson Line.	Nelson S.N. Co.
R.M.S. P. Meat Transports.	

and has a large holding in the—

Union Castle Co.	David McIver & Co.
Elder Dempster & Co.	British & African S.N. Co.
Lamport & Holt.	Elder Line.
Argentine Navigation Co.	Imperial Direct Line.
African S.S. Co.	James Moss & Co.
Belfast S.S. Co.	Moss S.S. Co.
British & Irish S.P. Co.	John Hall Junr. & Co.
Burns & Laird Lines.	Bullard King & Co.
Coast Lines.	

Thus, in the year 1925, this company owned a fleet of steamers measuring upwards of 400,000 tons, and had affiliation with another 1,700,000 tons or a total gross tonnage of 2,097,807.

Nor is this policy of combination among shipping companies confined to those of the United Kingdom. The two premier German companies were working together under an agreement for a long term of years.

Although the greatest reserve is maintained by the companies concerned and certain statements published have been formally denied, it is known that negotiations are now actively proceeding for the amalgamation of the Deutsch-Australische and Kosmos shipping companies with the Hamburg-Amerika Line. The importance of reorganisation in the German shipping industry is being urged, "especially in view of the projected establishment of a new British line to India and Australia."

If the amalgamation plan is carried out as expected, the Hamburg-Amerika "shipping trust," as it is already called, will be by far the largest group in the German shipping industry. The capital of the present Hamburg-Amerika group (including the Woermann and Deutsch-Ostafrika) is 63,000,000 marks. With the Austral and Kosmos, the total capital, apart from any further increase, would be 93,000,000 marks, compared with the 53,000,000 marks of the Norddeutsche Lloyd, the 16,000,000 marks of the Hansa,

and the 25,000,000 marks of the Hamburg-Sudamerika. The present tonnage of the Hamburg-Amerika group is 545,245 ; with the Austral and Kosmos and the 120,000 tons of the Stinnes fleet it would be 873,351. The Norddeutscher Lloyd fleet has a total tonnage of 613,000.

The Hamburg-Amerika and the Norddeutscher Lloyd groups are already co-operating to some extent, and have joint interests in certain smaller lines. An "Interessen Gemeinschaft" agreement which comes into force at the beginning of next year will ensure the pursuance of a common policy, at any rate in a number of important matters, and the possibility of an eventual fusion of practically all the German shipping lines in one big trust is already being discussed.¹

And, although it has been denied, there have been rumours that the three great Japanese shipping companies are considering whether it would not be beneficial to their interests if they agreed upon a common policy. Leases and agreements, be it noted, are not infrequently the preliminary steps towards a much closer form of partnership.

If one bears in mind, when considering this sphere of the economics of transport, that some of our railway companies have for years been endeavouring to improve their position by owning and developing terminal seaports, and have even launched out as shipowners on a more or less restricted scale, the possibility of greater amalgamations taking form is seen to be something more than a dream. The railway companies of the United Kingdom own, lease, or control over seventy ports and harbours, docks, and quays. One of these is the rapidly advancing port of Southampton. Cardiff, the greatest coal-exporting port in the world, is another. Managers² of even less tried ability than those who have built up some of the large shipping combinations might well be suspected of a larger policy, when their present schemes are carried through, and we may yet see, not the nationalisation of our railways, but the working together if not the close amalgamation, of some of our leading shipping and railway companies, who would be prepared, under a simplified system of management, to offer through services on a scale and with a convenience to the trading and travelling public hitherto

**Railway
Companies Co-
operating with
Shipowners.**

¹ Cf. *The Times*, 27th Oct., 1926.

unattainable to all parts of the world, irrespective of either distance or of frontiers.

The form of combination that has just been considered is usually advocated as leading to economies in management and the organisation of more efficient services. There is another form of combination, however, which is said to be rendered necessary by the peculiar conditions of ocean transport. This differs from the former in that, whilst in the former the individuality of the various companies that agree to combine may be merged in the bigger combination, in the latter, each member retains its individual existence, and in all but one direction, its freedom of action. The first kind of combination is a real trading together under one management ; the other gives scope to the individual managers of the companies concerned, but regulates their freedom of action as to loading, and as to freight rates.

Economy and Efficiency.

This second form is known as the *Shipping Conference*. As has already been stated it is the weapon of the regular lines against possible depredations by irresponsible tramp vessels.

Shipping Conference.

The contention that this policy of combining the shipping interests in one given trade in a conference is rendered necessary by the conditions of ocean transport, needs some further explanation. The position briefly is as follows : a cargo steamer of 7,500 tons could be built just prior to the war for about £48,000. This price is by no means fixed or unfluctuating. A steamer of this tonnage in the year 1900 cost no less than £68,000 to build. The lowest price quoted by builders was £36,000 in the year 1908, since when, with a momentary set-back in 1910, the price rose rapidly to £58,000 towards the end of 1912, dropped to £54,000 in the middle of 1913, and continued to fall to £48,000.

As to post-war prices for a cargo steamer, the value of a new single-deck steamer of 7,500 tons, built to a bare specification, was given (January, 1926) as about £52,500. It was stated that a shipbuilder was prepared to build a steamship of that tonnage, "a very plain job (part Continental steel) £60,000, or to a good specification (British steel) 73,000." ¹

¹ Article on Shipping Values, *Fairplay Annual Summary of British Shipping Finance*, 1926, p. 493.

But taking an average cost of such a vessel at from £50,000 to £60,000, it can be realised at once that a shipping company can in normal times be established with a comparatively small capital, and if content to experiment at first with one steamer, and merely develop the fleet as success warrants, the original modest capital can be increased from time to time until, if the business has expanded sufficiently, one hundred steamers, a large fleet to be under one flag, need not represent a greater amount of capital than somewhere about £5,000,000 ; and a goodly part of that may be represented by loans or debentures. There are, however, few shipping companies whose capital amounts to anything like this sum. The capital at stake in the majority of the large cargo-steamer companies varies from £100,000 to £500,000. A comparison, however, of the capital required for carrying on a shipping business, and that absorbed by the typical land transport agency, the railway, reveals the fact that the railway company requires a very much greater capital. A small country like the United Kingdom has required for the equipment of its railways, over £1,300,000,000 ; and the largest pre-war company was burdened with a capital of about £200,000,000.

In facing problems of management, both the railway manager and the shipowner have some special advantages but also some disadvantages. For the construction and equipment of a railway a large capital is necessary, but, at any rate, so far as this country is concerned, it has been arranged that where investors were willing to advance large sums, partly owing to natural conditions, but

**Facility of
Unparalleled
Competition.**

mainly by State guarantee, the company permitted to construct and carry on a railway at great cost should have a species of monopoly in its trading a monopoly safeguarded against abuse, by the conditions laid down by the Charter of the Company, and the Acts of Parliament regulating the railway system generally. Here then the railway manager has the disadvantage of requiring a great amount of capital, but as an offset to that his position is assured against undue competition. Compare with this the shipowner's position in these same respects. He can operate one, two or more vessels on a minimum of capital. He has no need to give his attention to the equipment of terminal ports, harbours, depots, routes, and so on, but against these easy conditions so far as capital is concerned, the se

road is so free and open to all comers, that under normal conditions, he may be subjected to competition carried to a point unparalleled in any other industry. Anyone who can impress investors with his business ability can, by raising, under limited liability conditions, a few thousand pounds, take part in the work of ocean transport. Thus without some form of regulation, shipowners declare that it would be impossible to carry on their business ; and for the past forty years, they have been endeavouring to work out a system to safeguard shipping interests, and prevent the worst forms of cut-throat competition. In the first instance, it was competition between English-owned ships that had to be mitigated ; for over a long period

Rings. the shipping of the United Kingdom enjoyed the cream of the ocean transport business, harassed by

but few foreign competitors. During this period efforts were made to organise shipping rings for the purpose of regulating at any given time the amount of tonnage that might be on the berth for a given port. The success of these rings was fluctuating. Their operations were watched with suspicion by many well-known shipping people, and from time to time the rings were broken, only to be re-formed and probably include the *breaker* in the new organisation. Where all the brokers in one trade honourably agreed to load one ship at a time, and in other ways regulate export freights, there was a chance of some success. But the great difficulty that rendered most of the efforts abortive was that these embryo conferences had no weapon wherewith to enforce their arrangements on shippers. So long as the arrangement suited the shipper, he would be loyal to the ring, but the moment an outside ship was put on the berth offering lower rates, there was nothing to make it worth the shipper's while to ship by the ring. This drawback threatened to render nugatory all efforts towards regulating freights. But a practice which had survived from the old days of foreign ventures suggested to some ingenious brain a method for forging a weapon that would be effective in compelling all the large and regular shippers in a given trade to be loyal to the conference. During the pre-submarine cable days, it had been the rule for shippers to allow the captain of a ship 10 per cent. on the freight to enlist his good offices, presumably in case of anything going wrong at the port of destination, when only the man on the spot could act. This percentage on the freight was called *primage*. The *raison d'être*

for the payment ceased, but shipping companies still continued the charge, giving sometimes as an explanation that it was a payment for the use of ship's gear in loading and discharging cargo. It was used, by some members of the rings, as a means of offering an inducement to shippers, *e.g.*, by halving the primage, or even by returning the whole; thus the net freight was charged, and the

**Deferred
Rebates.**

letter of the agreement between members of a ring was kept. The new weapon of the conferences was not really the primage itself, but it was undoubtedly suggested by this old practice. The new policy is called the system of deferred rebates, and it gives the shipping companies a firm hold over regular exporters of goods. Freights are fixed but shippers are informed that the rate is subject to a rebate, usually 10 per cent., which will be returned to the shipper at the end of a given period (six or twelve months), provided that he makes a declaration to the effect that during the whole of a given period he has shipped exclusively by conference lines. If he cannot make this declaration, the whole of the rebate is forfeited. In the case of regular shippers, these deferred rebates mount up to large sums, and thus it is not worth the while of the shipper to risk a large future repayment, in order to make a small immediate gain.¹

Shipping conferences have been organised in connection with the whole of the export trade of the United Kingdom, with the exception of the North Atlantic cargo trade. The

**Extent of the
Conferences.**

coasting trade, owing to the competition of railway companies, has not been subject to the conference system, whilst it has been found impossible to organise it in connection with a few of the import trades. This last is due to the fact that, in some of the import trades, the amount of raw materials and food-stuffs to be transported is so much greater in bulk than the outward freight that the conferences lines cannot restrict it to themselves. But even the import trades are now coming increasingly under the influence of the conferences.

Naturally there have been attempts to break the power of the

¹ For full particulars of the history and working of the system, cf. *The Report of the Royal Commission on Shipping Rings*, Cd. 4668, 1909; also *British Shipping*, pp. 183-202.

conferences ; and, so far as South Africa is concerned, there is an appearance of success in that the conference lines have had outwardly to abandon the policy. The action of the South African Government, however, has led to another development which promises to put shipping business on a yet healthier basis. For in place of the shipping companies combining for freight purposes against the shippers, the new policy is based on community of interests.

**Attempts to
Break
Conferences.**

**Benefit of
Regularity.**

A conference undoubtedly offers a better service than competing lines can. There is regularity of both service and freight which offer advantages not only to shippers, but, indirectly, to all the labour employed, both on the ships themselves, and in the ports they frequent. This regularity of service and rate is no small benefit to the shipper, and he has grasped its utility. Hence, when the action of the South African Government threatened to break up the conference, and in theory succeeded in so doing, in practice the shipping and shipper interests have shown rather more than a tendency to work together, practically on a conference policy, without the cast-iron regulations which form an objectionable, but, at first, necessary part of the system. This gives yet another instance of the tendency of modern business towards regularity and the elimination of the element of uncertainty, which is conducive to speculation.

With the great development of continental shipping, the spheres of action of the conferences have been extended. Several of them are now International, and have contributed powerfully in assisting the movement, already noted in connection with the regulation of shipping, towards International agreements in the law and practice of maritime trade. Whilst this is true it is worth while considering to what extent conferences can regulate freights. Is their power unlimited, or does some economic law step in and restrict their power ? From time to time there are suggestions made that freights in the several trades should be standardised, and at first sight the suggestion looks attractive. But a study of the subject over a sufficiently long period of time brings out some interesting points, two of them not only interesting, but informing.

It will be found that the wish for standard rates is expressed by

**International
Conferences.**

two sets of people at two different conditions of the freight market. At those exceptional times for instance, when Black Sea freights touch the figures they did in 1896, 1900 and 1912, namely, 20s., 18s., and 27s. respectively, shippers looking back to the days when rates were lower—from 9s. 6d. to 13s. 6d.—very naturally yearn after a standardised and lower rate; when the bad years for shipping come round, as come they do with persistent regularity, it is not the experience to find shippers sighing after a standard rate that might be 5s. or 6s. a ton more than the current quotation. And, on the other hand, whilst shipping managers are glowing with pleasure and good nature when the high-water mark is reached, during the lean years it is they who sigh after the more expansive days, and dream of standard rate of freight. Thus in a falling freight market the suggestion comes from the shipowner, but when the rise comes, he is satisfied with things as they are; it is the shippers' turn to see the advantage of steady rates.

So far as the question of the possibility of a conference raising freights and maintaining them at an abnormal level is concerned, the economist would say that so long as the conditions of ocean transport services remain comparatively free and open, all that a conference can effect is what a well-organised Trade Union does for the wage rate of its members. The Trade Union can enable its members to get their full economic share of the results of production, it can stave off a fall of wages to the latest economic moment, and it can accelerate a rise of wages, in that its efforts will result in winning for its members a rise the moment that there is economic justification for it. Under existing circumstances it is probably true to say that a conference, if well organised, does obtain for its members the full economic rate of freight under all circumstances; it puts off the fall to the last possible moment, and obtains a rise the instant that the market will bear it. Otherwise its influence on the rate of freights is limited by the law of supply and demand. The great benefit accruing from conferences is greater regularity of service, and this is the economic justification for their existence. Indirectly, a conference fulfils the function of a regulator of freight rates. More than this, under present conditions, it is unsafe to say, for the shipping industry

**Standard
Rates.**

**Economic
Limits of
Regulation.**

is affected by so many influences over which it has little or no control. As instances of these may be cited the failure of crops in some well defined agricultural area, whence in normal years, the export is considerable; or the reverse of this: a bumper harvest resulting in large quantities of food-stuffs to carry to countries which are unable to grow sufficient food for themselves. Another instance would be the development of new areas, brought about sometimes suddenly, as by the oil boom, requiring large quantities of machinery, and other forms of equipment, in the shortest possible time. Or, again, it may be the human factor that is the disturbing element. Shipowners attracted by rising freights may act unwisely and launch an excess of new tonnage, when freights may fall as suddenly as they have risen. On the other hand, it may be the labour force that is the cause of the fluctuation. New tonnage may be wanted at short notice and shipbuilding labour may find this an advantageous moment to call a strike. The stoppage of shipbuilding when there is a great demand for tonnage will at once send freights up. Or it may be the transport workers that strike, and a great port may be paralysed in consequence. All these and many other factors are continually cropping up to overturn the most carefully-laid schemes.

Thus, so long as there is no real monopoly on the sea-route (and so far as one can see there is no likelihood of such a condition arising), it will be impossible to obtain for shippers of goods, schedules of class rates on the railway system. It is against human nature to expect either shipper or shipowner to forgo his advantage when it offers.

**Scheduled
Class Rates
Impossible.**

At the same time, it is well worth noting that the recent experience in cases where a conference is forbidden by Government regulation has led not only to the suggestion, but to the practice, of shipper and owner coming to a mutual understanding. This is a tendency yet in its infancy; it will be a shy child, and a cold wind from any quarter might lead to premature death. Its continued existence and development, however, would be an evolution on sound lines. There would result regularity of service and a diminution of speculation; this is in accordance with the highest business development in other spheres, and so there is some precedent for it. Time alone can show whether cut-throat competition or regulation

based on common interest is to be the last word in fixing freight rates.

The earnings of shipping mainly depend, of course, on freights—mainly, but not entirely, for there are some favoured shipping companies who enjoy advantages unknown beyond the circumference of a small circle. These favoured concerns flourish and make money to an extent only known to themselves, even in bad times. But they resemble manufacturers ashore, who, by using special secret processes or working patents, are able to make a rate of profit quite unthought of in normal competing businesses. The well-known shipping journal, *Fair Play*, in its last number for each year, publishes interesting tables and diagrams, showing the results of the past year's, or of several years', working of various shipping interests. One of these diagrams shows the amount of profit or loss made by cargo-boat companies during the past nine years ; the result being arrived at by deducting interest on loans, office expenses and depreciation at 5 per cent. per annum on the cost of the vessels owned. The results prove that shipping is a rich man's investment, for he can afford to put the lean years against the fat, and be content with an average. The table in question shows that, from 1904 to 1910, where due allowance was made for depreciation, there was not only no profit to divide, but a loss to face. The next three years, however, told a different story ; things were booming, and profits abnormal. Then the downward tendency was once again experienced, warning one that in shipping investments, the investor must be prepared to average out profit and loss over a fairly long period of years. The shipping manager can, but usually does not help in this. It has been in the past far too generally the custom to divide profits up to the hilt. An unwise management shuts its eyes to the fact that each year its fleet of ships is growing older, and must sooner or later be replaced by new tonnage, if the company is to continue operating. Shareholders naturally accept thankfully all they can get in the way of dividends, but they are apt to be very angry when they are informed that their capital has petered out, and that no depreciation fund had been in operation to meet the cost of renewing a worn-out fleet. They then refuse to advance further capital, and the company goes into voluntary liquidation. Fortunately, the reports of the last few years show that managers,

Shipping Profits.

great and small, are more widely awake to the advantages, nay, the necessity, for adequate depreciation funds; and by examining the accounts published during the boom period, the most satisfactory feature, from the business point of view, is the more general attention to the sound policy of having a sufficient proportion of gross profits set aside as a reserve.

CHAPTER VI

BRITISH SHIPPING DURING THE WAR

THE war will be remembered for many and various changes which it caused. Old customs, well established precedents, all went by the board, and in looking back there is much that shows a breaking away from the past. Part of this may be for the good of the world—much can only be looked upon as loss. Up to July, 1914, there was a chivalry of the sea and a tradition full of honour—a source of legitimate pride of every mariner, high or low. The German has done much to break this honourable record.

Chivalry of the Sea.

Unrestricted submarine warfare was said to be Germany's reply to the British blockade which threatened Germany with starvation.

British Blockade of Germany.

The truth is that the British blockade of Germany did not apply to food-stuffs for civilians, till Germany issued a corn requisitioning order which stultified the distinction as to destination prescribed by the Declaration of London. And let it be carefully noted and remembered that before our Government made the blockade effective against food-stuffs, Germany had sunk food cargoes on their way to this country—the notable case being the *William P. Fry*.

In the year 1919, the Admiralty published a return¹ giving complete information as to our shipping losses during the period from August, 1914, to November, 1918. This return shows separately British merchant and fishing vessels captured or destroyed by the Enemy; also those damaged or molested by the Enemy, but not sunk. It records, so far as is known, the name, gross tonnage, date, position, method of attack, cause of loss or of escape, and the number of lives lost in each instance. The return concludes with three summaries in the form of tables, and these are reprinted at the end of this Section.

British Shipping Losses, 1914-1918.

These official figures show that between 4th August, 1914, and 11th November, 1918, the total number of British merchant ships lost owing to attack by surface or submarine war vessels, aircraft or

¹ *Merchant Shipping Losses*, No. 199, H.M. Stationery Office.

from the explosion of mines was 2,479, having a gross tonnage of 7,759,090, whilst no less than 14,287 lives were lost. Of our fishing fleets, 675 vessels of 71,765 tons were lost, and 434 fishermen perished. Nor is this the full tale, for the third table records that 1,885 British merchant ships, aggregating over 8,000,000 gross tons, were damaged or molested, and in connection with these, 592 lives were lost. Thus, in all, 15,313 non-combatants were ruthlessly put to death on the high seas, in many cases under circumstances of the greatest brutality; and some fifteen and three-quarter million tons of our shipping was sunk, damaged, or molested.

It is very interesting to read through the "Return" carefully and note developments. The first ship sunk was the *San Wilfrido*, a steamer of 6,458 tons, on 3rd August, 1914. She struck a mine off Cuxhaven, and her crew were made prisoners. The *Dresden* captured the *Hyades*, 3,352 tons, on 15th August, 1914, and sunk her by gun-fire, 180 miles North-East of Pernambuco. The *Emden* commenced her career by capturing and sinking the *Indus*, 3,413 tons, on 10th September, 1914, 240 miles South-East by East from Madras.

It was during the month of January, 1915, that submarine attacks without warning commenced. The first victim of this policy was the *Tokomaru*, 6,084 tons, sunk 7 miles from Havre by a torpedo, without warning; fortunately, no lives were lost in this instance.

Germany's
"No Warning"
Policy.

This was on the 30th January, 1915. On the same day the *Ikaria*, 4,335 tons, was also torpedoed without warning 25 miles from Havre, no lives being lost, but the *Oriole*, 1,489 tons, was less fortunate, for on the same day she was torpedoed, probably by a submarine, in the English Channel, and the master and 20 of the crew lost their lives. This begins a new chapter of sea history.

On 28th March, 1915, the *Falaba*, 4,806 tons, belonging to the Elder Dempster Line, was captured and torpedoed, and the captain and 104 passengers and crew lost their lives. This was the greatest loss of life in any one case up to that date. The *Falaba* case is an instance of the fiendish attempt to sink ships with all on board in such a way as to leave no trace. When the ship was sinking the crew and passengers took to the boats, upon which the submarine

opened fire on the helpless people in the open boats. But on 7th May of the same year, the crowning horror was accomplished by the sinking of the *Lusitania*, 30,396 tons, a few miles off the Old Head of Kinsale—the record is laconic but damning, “Submarine—no warning—Torpedo—1,198 lives lost.” Another entry in the “Return” marks an event that no British sailor will ever forget. It reads as follows:—“*Brussels*, 1,380 tons, 23rd June, 1916, off Dutch coast—Torpedo Boat—Captured—Taken into Zeebrugge—Crew made prisoners—Master subsequently shot.” The torpedoing of the *Lusitania* and the murder of Captain Fryatt, were not only criminal but stupid. Such acts could not help to win the war; indeed, they had considerable effect in losing it.

It is hardly necessary to mention that Hospital Ships ran the same risks as War Ships or merchant vessels. The first to be attacked was the *Lanfranc*, 6,287 tons, sunk by a torpedo from a submarine, *without any warning*, on 17th April, 1917. This occurred 42 miles from Havre, and fortunately only 5 lives were lost. The following month the *Dover Castle*, 8,271 tons, also a Hospital Ship, was torpedoed by a submarine without any warning, but again fortunately only 7 lives were lost. Two other Castle Liners serving as Hospital Ships were not, however, so fortunate, for on 26th February, 1918, the *Glenart Castle*, 6,824 tons, was torpedoed by a submarine, without warning, 10 miles West of Lundy Island, and no less than 95 lives were lost; and on 27th June, of the same year, the *Llan-doverly Castle*, 11,423 tons, was torpedoed by a submarine, without warning, and the loss of life amounted to 146.

The high-water mark of submarine frightfulness was reached in 1917, when our total losses of merchant vessels amounted to 1,197 ships of 3,729,785 tons: the worst month of that, or any year, being April, when 169 ships measuring 545,282 tons were lost, and the death roll was 1,125, a number only exceeded the month the *Lusitania* was sunk, viz., May, 1915, when the total loss of life was 1,208.

In spite of these unprecedented risks there is no case on record of a British crew refusing to sail during the period of submarine warfare. The bearing throughout the war of the British sailor was superb, worthy of the proudest moments in our history.

It has been noted that the total loss of British Ships during the war period was 7,759,090 gross tons, but part of that loss was replaced by new construction, capture from the enemy, and purchase from foreign owners.

New Merchant Shipping.

Our shipbuilding yards, in addition to assisting to keep our Navy in repair, and supplying a great amount of tonnage for war purposes, launched 4,342,296 tons of new merchant shipping. We captured 716,520 tons from the enemy, and purchased from abroad 530,000 tons. But it should be remembered that our normal increase would be much greater, and that the tonnage operated was run threadbare, whilst many obsolete vessels were kept in commission or were recommissioned. In a word, our mercantile marine at the end of 1918, was in a very different condition from that of 1914, the tonnage had decreased, and the general efficiency was considerably lower.

Germany had also destroyed, during the war period,¹ six million tons of foreign shipping. But our Allies utilised 1,676,155 tons of captured enemy ships, and our Overseas

Effects on Foreign Shipping.

Dominions, our Allies and neutral states produced 6,507,231 tons of new shipping. Thus the net loss of tonnage by the British Empire, her Allies and Neutral States, was less than two million tons. But again, it must be remembered, that six normal years would have resulted in a very considerable addition to world shipping tonnage; hence, there was a great amount of leeway to make up before commerce would be fully supplied with ocean transport facilities.

¹ See *Parliamentary Paper*, Cd. 9221, of 1918.

TABLE "A."

SHOWING NUMBER AND GROSS TONNAGE OF BRITISH MERCHANT VESSELS LOST
DURING ENEMY ACTION DURING EACH MONTH SINCE THE OUTBREAK OF
WAR; AND NUMBER OF LIVES LOST.

Month.	By Cruisers, T.B.'s, etc.			By Submarines.			By Mines.			By Aircraft.			Total.		
	No.	Gross Tonnage.	Lives lost.	No.	Gross Tonnage.	Lives lost.	No.	Gross Tonnage.	Lives lost.	No.	Gross Tonnage.	Lives lost.	No.	Gross Tonnage.	Lives lost.
1914.															
August	8	33,796	—	—	—	—	1	6,458	—	—	—	—	9	40,254	—
September	19	84,403	—	—	—	—	2	3,816	29	—	—	—	21	88,219	29
October	14	65,161	—	1	866	—	4	11,778	24	—	—	—	19	77,805	24
November	2	3,784	—	2	2,084	—	1	3,020	—	—	—	—	5	8,888	—
December	5	15,995	—	—	—	—	5	10,040	16	—	—	—	10	26,035	16
1915.															
January	3	12,304	—	7	17,126	21	1	2,624	—	—	—	—	11	32,054	21
February	4	10,350	—	8	21,787	9	2	4,235	21	—	—	—	14	36,372	30
March	2	7,031	—	21	64,448	161	—	—	—	—	—	—	23	71,479	161
April	—	—	—	11	22,453	38	—	—	—	—	—	—	11	22,453	38
May	—	—	—	19	84,025	1,208	—	—	—	—	—	—	19	84,025	1,208
June	—	—	—	29	76,497	78	2	6,701	3	—	—	—	31	83,198	81
July	—	—	—	19	48,844	26	1	4,003	2	—	—	—	20	52,847	28
August	—	—	—	42	135,153	205	7	13,311	43	—	—	—	49	148,464	248
September	—	—	—	22	89,693	44	8	11,997	33	—	—	—	30	101,690	77
October	—	—	—	10	39,061	35	7	15,095	7	—	—	—	17	54,156	42
November	—	—	—	23	84,816	25	9	9,677	93	—	—	—	32	94,493	118
December	—	—	—	16	65,011	416	5	9,479	3	—	—	—	21	74,490	419
1916.															
January	8	27,888	17	5	27,974	28	3	6,426	19	—	—	—	16	62,288	64
February	4	14,735	1	7	24,059	34	14	36,096	243	1	970	13	26	75,860	291
March	—	—	—	19	83,492	44	7	15,597	29	—	—	—	26	99,089	73
April	—	—	—	37	126,540	119	6	14,653	12	—	—	—	43	141,193	131
May	—	—	—	12	42,165	6	8	22,356	8	—	—	—	20	64,521	14
June	1	1,380	1	11	33,849	34	4	1,747	29	—	—	—	16	36,976	64
July	2	4,710	—	21	69,962	58	5	7,760	11	—	—	—	28	82,432	69
August	—	—	—	22	42,553	4	1	801	4	—	—	—	23	43,354	8
September	1	964	—	34	84,596	16	7	19,012	4	—	—	—	42	104,572	20
October	1	1,676	—	41	146,891	182	7	27,681	15	—	—	—	49	176,248	197
November	—	—	—	42	96,672	55	7	72,137	45	—	—	—	49	168,809	100
December	10	51,999	4	36	109,936	91	12	20,357	91	—	—	—	58	182,292	186
1917.															
January	6	19,304	—	35	109,954	245	8	24,408	31	—	—	—	49	153,666	276
February	7	28,679	—	86	256,394	355	12	28,413	47	—	—	—	105	313,486	402
March	11	42,893	18	103	283,647	630	13	26,938	51	—	—	—	127	353,478	699
April	—	—	—	155	516,394	997	14	28,888	128	—	—	—	169	545,282	1,125
May	1	819	11	106	320,572	507	14	28,114	73	1	2,784	—	122	352,289	591
June	1	3,947	—	116	391,004	384	4	19,256	29	1	3,718	3	122	417,925	416
July	—	—	—	88	319,931	401	11	44,927	67	—	—	—	99	364,858	468
August	1	1,608	—	84	310,551	415	6	17,651	47	—	—	—	91	329,810	462
September	—	—	—	68	173,437	293	9	22,335	60	1	440	3	78	196,212	356
October	1	1,159	—	79	261,649	578	6	13,324	30	—	—	—	86	276,132	608
November	—	—	—	56	154,806	376	8	18,754	44	—	—	—	64	173,560	420
December	1	2,284	—	76	227,195	520	8	23,608	65	—	—	—	85	253,087	585
1918.															
January	—	—	—	57	179,973	291	—	—	—	—	—	—	57	179,973	291
February	—	—	—	68	224,501	697	1	2,395	—	—	—	—	69	226,896	697
March	—	—	—	79	194,839	490	3	4,619	20	—	—	—	82	199,458	510
April	3	4,211	—	67	209,469	488	2	1,863	1	—	—	—	72	215,543	489
May	—	—	—	59	188,729	407	1	3,707	—	—	—	—	60	192,436	407
June	—	—	—	49	158,660	453	2	4,330	16	—	—	—	51	162,990	469
July	—	—	—	37	165,449	202	—	—	—	—	—	—	37	165,449	202
August	—	—	—	41	145,721	217	—	—	—	—	—	—	41	145,721	217
September	—	—	—	48	136,859	521	—	—	—	—	—	—	48	136,859	521
October	1	1,622	—	23	54,577	318	1	3,030	—	—	—	—	25	58,229	318
To Nov. 11	—	—	—	2	10,195	1	—	—	—	—	—	—	2	10,195	1
TOTAL to Nov. 11, 1918	117	442,702	52	2099	6,635,059	12723	259	673,417	1493	4	7,912	19	2479	7,759,090	14287

TABLE "B."

SHOWING NUMBER AND GROSS TONNAGE OF BRITISH FISHING VESSELS
LOST THROUGH ENEMY ACTION DURING EACH MONTH SINCE THE
OUTBREAK OF WAR; AND NUMBER OF LIVES LOST.

Month.	By Cruisers, T.B.'s, etc.			By Submarines.			By Mines.			Total.		
	No.	Gross Tonnage.	Lives lost.	No.	Gross Tonnage.	Lives lost.	No.	Gross Tonnage.	Lives lost.	No.	Gross Tonnage.	Lives lost.
1914.												
August	25	4,368	—	—	—	—	1	70	5	26	4,438	5
September	—	—	—	—	—	—	6	1,032	25	6	1,032	25
October	—	—	—	—	—	—	2	283	5	2	283	5
November	—	—	—	—	—	—	6	460	42	6	460	42
December	3	294	—	—	—	—	2	486	18	5	780	18
1915.												
January	—	—	—	—	—	—	2	222	—	2	222	—
February	—	—	—	—	—	—	—	—	—	—	—	—
March	—	—	—	—	—	—	1	289	1	1	289	1
April	—	—	10	1,760	20	1	170	2	11	1,930	22	22
May	4	689	22	3,982	4	6	977	28	32	5,648	32	32
June	—	—	58	7,749	17	2	368	9	60	8,117	26	26
July	—	—	36	3,966	—	3	461	26	39	4,427	26	26
August	—	—	36	2,454	—	2	436	9	38	2,890	9	9
September	—	—	6	292	—	2	153	12	8	445	12	12
October	—	—	—	—	—	—	—	—	—	—	—	—
November	—	—	—	—	—	—	1	162	2	1	162	2
December	—	—	—	—	—	—	—	—	—	—	—	—
1916.												
January	—	—	7	357	—	—	—	—	7	357	—	—
February	—	—	2	68	—	—	—	—	2	68	—	—
March	—	—	6	304	—	1	303	9	7	607	9	9
April	1	173	2	43	—	—	—	—	3	216	—	—
May	—	—	5	201	1	—	—	—	5	201	1	1
June	—	—	—	—	—	—	—	—	—	—	—	—
July	—	—	36	2,796	2	—	—	—	36	2,796	2	2
August	—	—	12	1,474	—	1	198	9	13	1,672	9	9
September	—	—	38	4,811	—	—	—	—	38	4,811	—	—
October	—	—	9	1,138	—	—	—	—	9	1,138	—	—
November	—	—	14	1,474	—	1	126	8	15	1,600	8	8
December	—	—	3	224	—	3	212	9	6	436	9	9
1917.												
January	—	—	16	2,020	2	—	—	—	16	2,020	2	2
February	—	—	28	3,152	4	2	326	19	30	3,478	23	23
March	—	—	43	3,586	3	—	—	—	43	3,586	3	3
April	—	—	41	5,920	14	—	—	—	41	5,920	15	15
May	—	—	17	1,054	—	2	394	18	19	1,448	18	18
June	—	—	20	1,296	—	1	46	—	21	1,342	—	—
July	—	—	17	2,679	1	1	57	5	18	2,736	6	6
August	—	—	4	230	1	1	12	5	5	242	6	6
September	—	—	6	233	—	1	12	5	7	245	5	5
October	—	—	3	116	4	2	111	15	5	227	19	19
November	—	—	3	87	—	—	—	—	3	87	—	—
December	1	113	4	79	—	2	221	13	5	413	17	17
1918.												
January	—	—	10	375	1	—	—	—	10	375	1	1
February	—	—	9	306	3	3	380	17	12	686	20	20
March	—	—	9	209	—	1	84	10	10	293	10	10
April	—	—	3	241	—	—	—	—	3	241	—	—
May	—	—	16	504	7	—	—	—	16	504	7	7
June	—	—	4	312	11	2	327	6	6	639	17	17
July	—	—	12	555	3	—	—	—	12	555	3	3
August	—	—	13	1,536	—	—	—	—	13	1,536	—	—
September	—	—	—	—	—	1	142	—	1	142	—	—
October	—	—	—	—	—	—	—	—	—	—	—	—
To November 11 Total to 11th } November, } 1918 }	34	5,637	4	578	57,583	98	63	8,545	332	675	71,675	434

TABLE "C."

SHOWING MONTHLY AND GROSS TONNAGE OF BRITISH MERCHANT VESSELS
DAMAGED OR MOLESTED (BUT NOT SUNK) BY THE ENEMY DURING EACH
MONTH SINCE THE OUTBREAK OF WAR; AND NUMBER OF LIVES LOST.

Month.	By Cruisers.			By Submarines.			By Mines.			By Aircraft.			Total.		
	No.	Gross Tonnage.	Lives lost.	No.	Gross Tonnage.	Lives lost.	No.	Gross Tonnage.	Lives lost.	No.	Gross Tonnage.	Lives lost.	No.	Gross Tonnage.	Lives lost.
1914.															
August	8	44,731	—	—	—	—	2	6,575	—	—	—	—	10	51,306	—
September	5	26,932	1	—	—	—	—	—	—	—	—	—	5	26,932	1
October	7	30,193	—	—	—	—	—	—	—	—	—	—	7	30,193	—
November	1	5,732	—	—	—	—	—	—	—	—	—	—	1	5,732	—
December	2	6,024	2	1	1,209	—	1	4,592	—	—	—	—	4	11,825	2
1915.															
January	—	—	—	1	1,871	—	1	1,742	—	—	—	—	2	3,613	—
February	1	4,583	—	10	37,043	—	3	9,849	13	—	—	—	14	51,475	13
March	—	—	—	29	93,250	1	1	3,868	1	8	10,915	—	38	108,033	2
April	1	6,849	8	7	31,479	2	—	—	—	2	3,542	—	10	41,870	10
May	—	—	—	19	117,591	—	—	—	—	—	—	—	19	117,591	—
June	—	—	—	18	77,273	—	2	10,706	—	—	—	—	20	87,979	—
July	—	—	—	16	77,492	31	2	10,406	—	1	988	—	19	88,886	31
August	—	—	—	19	55,639	—	2	11,620	—	—	—	—	21	67,259	—
September	—	—	—	5	35,058	—	2	9,617	2	1	1,270	—	8	45,943	2
October	—	—	—	4	58,450	—	3	6,564	—	1	1,408	—	8	66,422	—
November	—	—	—	11	64,460	—	1	2,286	—	2	2,657	—	14	69,403	—
December	—	—	—	8	70,295	—	1	4,844	—	1	2,414	—	10	77,553	—
1916.															
January	1	7,781	—	10	50,997	—	3	8,279	—	2	3,372	—	16	70,429	—
February	1	11,484	—	7	114,010	—	3	10,876	—	1	1,680	—	12	138,050	—
March	—	—	—	13	50,657	—	1	3,381	—	—	—	—	14	54,038	—
April	1	2,195	—	12	58,543	—	—	—	—	—	—	—	13	60,738	—
May	—	—	—	10	38,156	—	—	—	—	5	17,016	2	15	55,172	2
June	—	—	—	11	50,635	—	1	3,232	—	—	—	—	12	53,867	—
July	—	—	—	6	22,528	—	—	—	—	1	1,081	—	7	23,609	—
August	—	—	—	13	34,825	—	1	4,854	—	1	7,988	—	15	47,667	—
September	—	—	—	29	122,933	—	—	—	—	—	—	—	29	122,933	—
October	—	—	—	32	125,770	1	1	8,253	—	—	—	—	33	134,023	1
November	—	—	—	36	157,633	—	4	24,258	4	—	—	—	40	181,891	4
December	—	—	—	41	168,838	—	5	34,502	1	—	—	—	46	203,340	1
1917.															
January	—	—	—	29	140,722	1	1	5,686	—	—	—	—	30	146,408	1
February	—	—	—	74	313,971	15	4	48,516	—	1	3,563	—	79	366,050	15
March	—	—	—	77	329,192	64	3	15,459	—	2	2,292	—	82	346,943	64
April	1	3,562	—	92	426,680	21	6	47,587	3	1	1,780	—	100	479,609	24
May	—	—	—	97	388,258	3	1	1,968	—	1	2,821	—	99	393,047	3
June	—	—	—	122	549,907	18	5	29,278	—	1	1,243	—	128	580,428	18
July	—	—	—	76	383,793	6	2	5,150	—	6	8,337	—	84	397,280	6
August	—	—	—	54	252,504	10	3	15,641	—	—	—	—	57	268,145	10
September	—	—	—	61	213,199	37	3	9,491	3	2	9,966	2	66	232,656	42
October	—	—	—	43	162,755	24	2	9,754	—	—	—	—	45	172,509	24
November	—	—	—	50	191,601	27	2	9,552	—	—	—	—	52	201,153	27
December	—	—	—	60	223,533	56	3	12,900	—	1	353	—	64	236,786	56
1918.															
January	1	401	1	49	188,550	23	2	8,882	—	—	—	—	52	197,833	24
February	—	—	—	53	186,283	12	1	3,752	—	2	2,686	—	56	192,721	12
March	—	—	—	81	322,239	63	3	18,047	32	1	1,855	—	85	342,141	95
April	—	—	—	65	277,984	6	—	—	—	—	—	—	65	277,984	6
May	—	—	—	74	237,420	54	1	3,949	5	—	—	—	75	241,369	59
June	—	—	—	40	183,206	12	—	—	—	—	—	—	40	183,206	12
July	—	—	—	54	208,228	18	—	—	—	—	—	—	54	208,228	18
August	—	—	—	54	199,764	7	1	2,980	—	—	—	—	55	202,744	7
September	—	—	—	34	144,601	—	1	3,550	—	—	—	—	35	148,151	—
October	—	—	—	18	85,196	—	—	—	—	—	—	—	18	85,196	—
To Nov. 11	—	—	—	2	9,608	—	—	—	—	—	—	—	2	9,608	—
TOTAL															
Nov. 11	30	150,467	12	1727	7,335,827	512	84	432,446	64	44	89,227	4	1885	8,007,967	592
1918															

PART IV

CIVIL AVIATION

WHEN the first edition of this book was written in 1914, it was not thought necessary to deal with aviation. It had not then come

**Its Long and
Interesting
History.**

within the sphere of practical transport. Very rapid progress in the intervening years has brought it within that sphere, and something should be written concerning it. Notwithstanding so much

that has been accomplished, however, as a means of transport, it is still in its infancy ; one looks at it more from the aspect of promise than of performance. But the history of artificial flight is long and interesting. It has always possessed a singular fascination for the human race. Long before the Christian era it exercised men's minds, as every schoolboy should know, and it is astonishing how soon they began to attempt to put their theories to the test of practical experiment. There is the familiar classical legend of Daedalus and Icarus his son, whose wax-fixed wings were detached by the heat of the sun with fatal consequences for him ; and in this country there is the legend that " about the Confessor's time " an English monk flew from a tower almost a furlong. Probably in these days we should call his achievement gliding rather than flying ; but, of course, gliding has been the " mother " of flying. It is unnecessary, however, to dwell on remote history. Any good encyclopaedia will tell the fascinating story. The aspect which will prove most striking is the persistency with which, through centuries, men sought to overcome their own physical limitations and to transport themselves through the air.

The passenger carrying gas balloon did not become an accomplished fact until 1783, but, of course, having done so much it was not very long before there were attempts to control the direction of flight. Sails and rudders were first tried, but with no success, and then steam engines. It is not surprising to find it recorded

**Early Attempts
at Directional
Flight.**

that these were failures, the weight to be carried being altogether

disproportionate to the power developed. It was the coming of the lighter internal combustion engine that made directional flying possible, and also the heavier than air machines ; but it was not until 1905 that in the United States of America the brothers Wilbur and Orville Wright successfully applied the petrol engine. From that time development was constant ; although looking back it now seems comparatively slow. People glimpsed its possibilities especially when, in 1909, Louis Blériot flew the channel on a small monoplane, but prior to the beginning of the European War in 1914 aeronautics was regarded as a very adventurous sport. And rightly so, for the aeroplanes, which then seemed rather wonderful, were after all primitive, and in many cases rather clumsy, affairs, poorly designed, inadequately engined. Some of those that went overseas in the early days of the war were big awkward machines not capable of doing very much more than wallow about like huge air whales. The art of aviation was just as little developed. Some of the early flying meetings were hindered and spoiled by a handful of wind which now would be regarded as of no consequence.

The war changed all that, as it did so many other things. It stimulated a very rapid development of both machines and the skill of the aviators, and long before the end mere boys, not very many months emancipated from the discipline of the public schools, equipped with well designed 'planes and high powered engines, performed hair-raising aerial acrobatics, until finally such feats excited little anxiety and much admiration, so familiar did they become. The stern necessities of the war resulted thus in an immense development of the aeroplane. 'Plane design was not only perfected in detail, but increased in variety from the very small single seater scout to the huge Handley-Page bombers. The development of engines was equally large and rapid. The net result of it all was that aviation emerged from the war a vastly different science. Under no other circumstances would so much have been achieved in so short a space of time. It emerged equipped in knowledge, material, and men ready to take up civil aviation on an extensive scale.

Civil aviation dates from August, 1919. At any rate, that is the month from which statistics begin. That its progress is very rapid may be assumed from the mere fact that it has already attained

the distinction of having published statistics. Perhaps it is advisable to get an idea of its extent by giving these at once.

They are compiled from returns furnished by the Air Ministry, and are published in the *British Statistical Abstract*, from which they are taken.

Civil Aviation
Since 1919.

BRITISH CIVIL AVIATION ON REGULAR AIR ROUTES
(INTERNAL AND CONTINENTAL)

Year.	Mileage Flown.	Passengers Carried.	Weight of Cargo (tons).
1919	104,000	870	30
1920	644,000	5,799	137
1921	225,000	5,256	19
1922	717,000	10,393	215
1923	943,000	15,552	328
1924	936,000	13,601	541

In the Blue Book there is a foot-note to the table stating: "The number of passengers carried represents the number of passenger stages flown, each stage averaging about 200 miles." There is a second table showing that during this period there were 6 fatal and 4 non-fatal accidents, and that of the crews 9 were killed and 5 injured, and of passengers 13 were killed and 5 injured. A third table gives the following particulars—

FLIGHTS AND PASSENGERS CARRIED BETWEEN UNITED KINGDOM
AND ABROAD

Year.	British Aircraft.		Foreign Aircraft.	
	Flights.	Passengers.	Flights.	Passengers.
1919	467	870	64	52
1920	2,854	5,799	768	584
1921	993	5,256	2,404	5,475
1922	2,891	9,490	2,148	2,969
1923	2,559	11,947	2,016	3,189
1924	2,794	10,456	2,044	7,402

The tables are very interesting as a record of great things accomplished in a very short period. It is remarkable that all this has been done not by the airship but by the aeroplane. Theoretically,

one would imagine that the airship presented larger possibilities, by reason of its greater carrying capacity both of passengers and goods.

**Airships yet
to be Proved.**

So far it has remained in the experimental stage. True some spectacular flights have been made such as the crossing of the Atlantic to America, and, of course, the war furnished evidence of its effectiveness as well as its limitations. But the experts are still engaged in hammering out the problems of construction, and in the realm of civil aviation the airship has still to be proved. When sufficient progress has been made (probably finality will never be reached) and the two methods of aerial transport are brought into full use, progress will be still more rapid.

There are one or two remarkable features of the tables. The mileage flown no doubt will prove rather surprising to people who live far away from the regular air routes, also the relative proportions of passengers to freight. So far the service seems to have been used more for passengers than for goods; and of the tonnage carried, mails, no doubt, account for a considerable portion. The British Post Office has organised an extensive mail service between this country, the continent of Europe, northern and western Africa, Australia, Canada, and the United States of America. Of course, to countries beyond the boundaries of Europe the mail is not an entirely air mail. Outside Europe the journey is completed by sea, although ultimately there will be a second flying stage between Egypt and India. And doubtless Australia will be linked up by means of a regular service through India and South Africa through Egypt. Such developments are in contemplation. Recently, at the Imperial Conference, Sir Samuel Hoare (Minister for Air) outlined an ambitious scheme for covering the greater part of the British Empire, the pioneer work in which is to be done by the military and naval air forces. He also has in contemplation the establishment of a commercial airship line between Britain and the various Dominions.

There is in these schemes, of course, a considerable element of Imperial politics. The Minister is mainly influenced by a desire to bring the outposts of the Empire closer together, and thus promote its consolidation and development, but whatever may be accomplished in this direction will necessarily facilitate inter-Imperial commerce.

**Imperial
Policy and Trade
Expansion.**

Without data to go upon it is impossible even to speculate on the increase in trade which should follow the shortening of the time taken by the journey from, say, this country to Australasia. Rapid and easy communications always mean increased trade, as we have seen in the earlier chapters of this book dealing with the development of roads, waterways, and railways. The more the difficulties of transport are eased and its speed increased, the greater the exchange of commodities between communities, whether they are primitive villages, towns, or cities within the borders of a single state, or whether they are distant outposts of Empire separated by thousands of miles of ocean.

Commercial aviation is as yet too recent to have evolved a complete theory of economics, but it seems to be developing on very well defined lines. Hitherto it has been of most

**Some Economic
Considerations.**

service in connection with the transport of passengers, but even in this connection it seems to have certain limitations. For instance, it appears to be demonstrated that it is of very limited value for comparatively short journeys. One or two attempts have been made to establish in this country a regular air service between such places as London, Birmingham, and Manchester. These are all considerable centres of population, and there must be an enormous number of railway passengers between them, but hitherto the enterprise which provided air services has not been conspicuously successful, if at all. Normally the journey by train is sufficiently short for all practical purposes, and in addition it is cheaper. In cases of extreme urgency, no doubt, it would be a great convenience to get from either of the three cities mentioned in the shortest possible time, but even in this connection the necessity for a journey by air is reduced by the facilities of the modern telephone service, notwithstanding all its alleged defects. The number of cases in which really urgent matters cannot be satisfactorily settled by telephone, and in which an aeroplane journey is essential, must be very limited. In this connection there is also the question of extra cost of travel, which under all the circumstances mentioned must act as a deterrent.

When we pass beyond the confines of the United Kingdom, however, quite another set of conditions begins to operate. The distances to be covered are greater, the saving of time is so much more considerable, there is the greater conveniences arising from

the smaller number of changes from vehicle to vehicle, the difference between the cost of an aeroplane journey and first class travel by land and water is an inconsiderable trifle, and, finally, for those people to whom a sea voyage is always a painful ordeal the aeroplane offers a very attractive substitute. To a man carrying on business in London a flight to the Continent, say to Paris or Rotterdam, is an immense convenience. He can leave London in the morning, do a full day's work in either of those cities, and return to London in the evening. In no other way would it be possible for him to do so much in so short a time. Putting hotel expenses on top of the cost of first class travel by land and water, probably the latter becomes much more expensive, but, even if it were not so, the possibility of doing in one day what otherwise would take at least two is a convenience which would quite outweigh a considerable difference in cost. For general travel, however, the air journey remains the more expensive, because experience shows that the majority of people who go from this country to the Continent go second class. For this reason the ordinary traveller having no pressure of business will continue to make his journey in the old way, but, no doubt, in course of time the development of the air service will result in a reduction of charges and a large increase in the number of passengers who take advantage of it.

There is just one antipathy to be overcome, that arising from the additional element of danger. From the figures tabulated above this would appear to be very small indeed, but there has not yet been time for people to outgrow the initial nervousness which the prospect of flying engendered; the fact that few of the pioneers of the science escaped violent death by it, and the fact that a fatal air crash always seems to possess more appalling features whether it does so actually or not. Express trains wrecked in collision or by any other means, and the foundering of ships at sea, present consequences even more appalling, but rightly or wrongly there seems to be less chance of either happening than of an aeroplane crashing. No doubt the time will come, and it may not be very far ahead, where this prejudice, the survival of early experience, will disappear, and people, generally, will think no more of a journey by air than they now do of one by train or in a ship. It will be no longer in the

**Large Distances
Essential.**

**The Element
of Danger.**

nature of a risky undertaking to be faced only by those of hardy adventurous spirit.

In the course of time a well defined economic theory will be developed concerning the transport of goods and merchandise by

**The Transport
of Goods.**

air. At present experience is short and information scanty as compared with the older and more familiar means of transport. On the surface one

would presume that air transport could not compete in the general run of commercial business. There are certain commodities which definitely exclude themselves from the list of things that can be economically transported by air. All bulky goods of comparatively low monetary value, for instance, are outside its sphere. No one would think of sending coal in such a vehicle, or similar mineral products, heavy chemicals, iron or steel girders for constructional work, large machines, such as lathes and presses, engines, or awkward things like pianos. Some of these may never go by air ; if others do, probably it will be in the day when the airship is perfected and in regular use. Even so, there would appear to be solid reasons against the eventual creation of a considerable traffic in them. But already there have been curious things transported by air, wild animals and reptiles for menageries or zoological gardens, for instance ; and he would be very bold who would attempt to place an absolute limit on individual items of traffic suitable to be dealt with by such a service.

To some people, probably it has been surprising to see from the newspapers that consignments of gold amounting to considerable values have been carried by air. Exactly why, it is impossible to say, but of course, gold though a heavy metal is not heavy in relation to value, and a thing of high value can support a heavy charge by air as much as by land. It has been suggested that one reason why such quantities of gold have been transported is that the handlings and delays due to transshipment are reduced, and consequently the risks of loss, and therefore there is a saving in insurance that makes it worth while. There may be other reasons besides this. Gold in transit is an idle metal earning nothing, costing something. In the cellars of a bank it is the solid foundation for a considerable superstructure of credit which not only has great earning power for the banker concerned, but is the life blood of commerce. Whatever doubts remain to be resolved by the test of practical experience,

it is certain that air transport is eminently suitable for post office mails. Speed alone is often a very valuable consideration, and the air service can give this as can no other. Then again there must be an infinite variety of articles of value suitable for its services. If gold, why not precious stones and articles of jewellery, for instance ?

No doubt the list could be prolonged, but sufficient has been written to indicate the main lines of future expansion, and the lines on which the economic theory of transport may develop. But it is nearly all in the nature of prophecy. The service is new. It has yet to become the everyday ordinary thing that other forms of transport have become ; but it has infinite possibilities of influencing the political, social, and commercial future of the world.

APPENDIX I

TABLE SHOWING THE DEVELOPMENT OF RAILWAY MILEAGE, CAPITAL, TRAFFIC, EXPENSES AND RECEIPTS FOR THE UNITED KINGDOM

(The figures are taken from the Statistical Abstract)

Year.	Length of Line open at end of each year. Miles.	Total paid-up Capital.	Number of Passengers carried. 1 Including season-ticket holders. 2 Excluding ditto.	Total Traffic Receipts.	Ditto per Mile.	Working Expenses.	Net Receipts.	Proportion of Working Expenses to Gross Profits.
							Not given till 1854.	%
1848	5,127	£ 200,173,059	57,965,070 ¹	£ 9,933,552	£ 1,937			
1855	8,280	297,584,709	118,595,135 ¹	21,507,599	2,597	£ 10,299,709	£ 11,207,890	
1865	13,289	455,478,143	251,959,862 ¹	35,751,655	2,691	17,149,072	18,602,582	
1875	16,658	630,223,494	506,975,234 ¹	58,982,753	3,563	33,220,728	28,016,272	
1885	19,169	815,858,055	697,213,031 ¹	66,644,967	3,505	36,787,957	32,767,817	54
1895	21,174	1,001,110,221	929,770,909 ²	81,396,047	3,844	47,876,637	38,046,065	53
1905	22,847	1,282,801,000	1,199,022,000 ²	105,131,709	4,601	70,064,663	43,466,356	56
1910	23,337	1,318,515,000	1,306,728,000 ²	114,237,132	4,885	76,569,676	47,355,889	62
1912	23,441	1,334,964,000	1,294,337,000 ²	118,307,216	5,047	81,224,343	47,329,074	63

¹ These figures are only continued to 1912, because in 1913 a new system was introduced and the figures for subsequent years are not properly comparable with those in the above table.

APPENDIX II

TABLE SHOWING THE CAPITAL, LENGTH OF LINE, RECEIPTS, AND EXPENDITURE ON RAILWAY WORKING FOR
THE UNITED KINGDOM (IRELAND EXCLUDED) SINCE 1919

(*Taken from the Statistical Abstract and the Ministry of Transport Return*)

Year.	Capital.	Length of line open.	Receipts from Railway Working.	Expenditure on Railway working.	Proportion of Expenditure to Receipts.	Net profit on Railway Working.
	£	Miles.	£	£	%	£
1919	1,298,505,000	20,289	178,171,988	164,646,083	92	13,525,905
1920	1,299,265,000	20,292	238,930,239	231,968,870	97	6,961,369
1921	1,299,824,000	20,282	217,796,991	226,767,460	104	8,970,469 ¹
1922	1,281,256,000	20,298	219,330,693	174,844,342	80	44,486,351
1923	1,155,533,000	20,314	205,814,233	165,978,844	81	39,835,389
1924	1,161,399,000	20,329	203,416,985	166,882,592	82	36,534,393
1925	1,177,417,000	20,390	199,652,875	165,024,012	82	34,628,863

¹ Deficit on railway working.

APPENDIX III

TABLE A

PART I. MAXIMUM TOLLS AND WHARFAGE CHARGES

SCALE I

APPLICABLE to all articles comprised in the classification, except cannel, tap mill forge, and coal cinders, coal, coke, culm and slack.

In respect of Merchandise comprised in the under-mentioned Classes, except as above.	MAXIMUM TOLLS.				Maximum Wharfage Charges.	
	For the first 3 miles or any part of such distance.	For the next 10 miles or any part of such distance.	For the next 10 miles or any part of such distance.	For the remainder of the distance.		
	Per ton per mile. d.	Per ton per mile. d.	Per ton per mile. d.	Per ton per mile. d.	Per ton. d.	
A.						A.
Division 1	0.50	0.50	0.25	0.25	1.50	Division 1
A	1.20	0.75	0.25	0.15		A
(Except Division 1) and B						(Except Division 1) and B
C	1.20	0.85	0.50	0.25	3	C
(Except Timber)						(Except Timber)
For Timber	1.30	0.95	0.55	0.35	3	For Timber
1	1.45	1.00	0.60	0.40	3	1
2					4	2
3					4	3
4					4	4
5					4	5

Division 1 of Class A comprises the following articles : Basic slag, unground gaslime or gas purifying refuse, gravel, limestone in bulk, manure (street, stable, farmyard) in bulk, night soil, slag or scoria (blast furnace) and stone and undressed material for the repair of roads, lime, gas water, refuse, and rubbish, to tips, and ashes.

Part I, Maximum Tolls and Wharfage Charges. Scale 2. Applicable to cannel, tap mill forge, and coal cinders, coal, coke, culm and slack not intended to be *bonâ fide* and exclusively used and consumed at a district work under the provisions of Section 20 of this schedule. On the part of the canal between Farmer's Bridge at Birmingham and Whittington Brook, including the Digbeth Branch—

Maximum Tolls
per ton per mile, 1d.

Maximum Wharfage Charges
per ton 1.50d.

On any other part of the canal—

Maximum Tolls
ton per mile, 1.40d.

Maximum Wharfage Charges
per ton, 1.50d.

Notwithstanding anything in this Schedule the toll in respect of cannel, tap mill forge, and coal cinders, coal, coke, culm and slack, to which Scale 2 is applicable, shall not exceed ninepence per ton for any distance except when conveyed by the way of the Birmingham Top Level to any part of the canal in Birmingham, or when conveyed to or from any other canal in Birmingham by the way of the Birmingham Top Level, in which case the toll shall not exceed ninepence halfpenny per ton for any distance, but the said toll of ninepence or ninepence halfpenny shall be in addition to the special charge authorised by this schedule for the Netherton Tunnel.

APPENDIX IV

CANALS OF THE SHROPSHIRE UNION RAILWAYS AND CANAL COMPANY

PART I. MAXIMUM RATES AND CHARGES

Applicable only to the canals of the Shropshire Union Railways
and Canal Co.

In respect of Merchandise comprised in the under- mentioned Classes.	MAXIMUM RATES FOR CONVEYANCE.				Maximum Station Terminal at each end.	MAXIMUM SERVICE TERMINALS.				
	For the first 10 miles or any part of such distance.	For the next 10 miles or any part of such distance.	For the next 10 miles or any part of such distance.	For the remain- der of the distance.		Loading.	Un- loading.	Cover- ing.	Un- cover- ing.	
	Per ton per mile. d.	Per ton per mile. d.	Per ton per mile. d.	Per ton per mile. d.	Per ton. s. d.	Per ton. s. d.	Per ton. s. d.	Per ton. d.	Per ton. d.	
A	0-90	0-80	0-70	0-60	3	—	—	—	—	A
B	1-15	1-00	0-90	0-75	3	—	—	—	—	B
C	1-50	1-40	1-25	1-00	6	3	3	1	1	C
1	1-65	1-50	1-30	1-10	9	5	5	1-50	1-50	1
2	2-10	1-90	1-75	1-40	9	8	8	2	2	2
3	2-60	2-20	1-75	1-65	1 0	1 0	1 0	2	2	3
4	3-00	2-75	2-20	1-95	1 0	1 4	1 4	3	3	4
5	3-60	3-25	2-80	2-25	1 0	1 8	1 8	4	4	5

APPENDIX V

THE MINISTRY OF TRANSPORT ACT, 1919

THE RAILWAY AND CANAL TRAFFIC ACT, 1888

THE RAILWAY COMPANIES OF THE UNITED KINGDOM

NOTICE OF INCREASE OF TOLLS, RATES AND CHARGES

NOTICE IS HEREBY GIVEN pursuant to the Railway and Canal Traffic Act, 1888, and the Order of the Board of Trade thereunder dated the 25th day of January, 1889 (so far as they may apply) that the Minister of Transport in pursuance of his powers under the Ministry of Transport Act, 1919, has directed the Railway Companies of the United Kingdom, and such Railway Companies accordingly intend to increase the Tolls, Rates and Charges published in the Books required by Act of Parliament to be kept for public inspection to the extent and in the manner undermentioned and that the altered Tolls, Rates and Charges are to come into force on the fifteenth day of January, 1920.

FOR AND ON BEHALF OF THE RAILWAY COMPANIES OF THE UNITED KINGDOM,

P. H. PRICE, *Secretary*,

RAILWAY CLEARING HOUSE, LONDON.

P. J. BRENNAN, *Secretary*,

IRISH RAILWAY CLEARING HOUSE, DUBLIN.

Dated the 29th day of December, 1919.

ALTERATION OF RATES

PART I

DESCRIPTIONS OF MERCHANDISE, ETC.

1. Coal, Coke, and Patent Fuel	2. Merchandise, in Class A of the General Railway Classification (other than Coal and Coke)	3. Merchandise in Class B of the General Railway Classification (other than Patent Fuel).	4. Merchandise in Class C of the General Railway Classification.	5. Merchandise in Classes 1 to 5 of the General Railway Classification.	6. Rolling Stock	ADDITIONS TO THE EXISTING TOLLS, RATES, AND CHARGES	
						25 per cent. and a flat rate addition of 3d. per ton, irrespective of distance, subject to a minimum addition to the existing Toll, Rate or Charge of 6d. per ton and a maximum addition of 2s. per ton.	
						30 per cent. and a flat rate addition of 3d. per ton, irrespective of distance, subject to a minimum addition to the existing Toll, Rate or Charge of 6d. per ton and a maximum addition of 2s. per ton.	
						40 per cent. and a flat rate addition of 3d. per ton, irrespective of distance, subject to a minimum addition to the existing Toll, Rate or Charge of 6d. per ton and a maximum addition of 3s. per ton.	
						50 per cent. and a flat rate addition of 6d. per ton, irrespective of distance.	
						60 per cent. and a flat rate addition of 1s. per ton, irrespective of distance.	
						60 per cent.	

7. Live Stock conveyed by Merchandise train at truck rates 60 per cent. and a flat rate addition of 1s. per truck or part truck, irrespective of distance.
8. Live Stock conveyed by Merchandise train at head rates 60 per cent.
9. Carriages of every description included in the Carriage class contained in the General Railway Classification (not being a carriage adapted and used for running on the Railway) and Vans and Caravans when conveyed by Merchandise train. 60 per cent. with a flat rate addition in the case of Vans and Caravans of 2s. 6d. per vehicle, irrespective of distance.

10. Small Parcels (as defined in Part VI of the Railway Rates and Charges Orders) conveyed by Merchandise train. 100 per cent.

11. Returned Empties conveyed by Merchandise train or by Passenger train, or other similar service—

(a) Consigned from one consignor to one consignee and conveyed in full truck loads. 50 per cent.

(b) In other cases. 100 per cent.

12. Merchandise and Parcels conveyed by Passenger train or other similar service (including perishable Merchandise specified in Part V of the Railway Rate and Charges Orders, Live Stock and Vehicles). 50 per cent.

13. Traffic not falling within the foregoing descriptions conveyed by Merchandise or by Passenger trains, or other similar service. 60 per cent.

MODIFICATIONS AND EXCEPTIONS

- (a) Fruit and Vegetables (other than Hothouse produce), Eggs, Butter, Cream, Soft-cheese and Poultry, conveyed by Passenger train or other similar service. 25 per cent.

- (b) Potatoes and Vegetables in Class C and Roots in Classes B and C of the General Railway Classification. { Conveyed by Merchandise Train in loads of 2 tons and upwards. } 25 per cent. plus the flat rates applicable and hereinbefore specified, irrespective of distance.

- (c) Merchandise and Live Stock conveyed to and from Great Britain and Ireland. The existing surcharges for sea transit to be reduced to the following amounts—

Merchandise	10s. per ton.
Horses, Mules, and other beasts of burden	10s. per head.
Cattle and Calves	5s. "
Pigs, Sheep, and Goats	2s. "
Lambs and other small animals	1s. "
No increase in existing Rates or Charges.	

- (d) Milk (fresh), Manure in bulk, Packed Manure, Basic Slag and Lime for agricultural purposes. No increase in existing Rates or Charges.

PART II

DESCRIPTION OF SERVICE OR ACCOMMODATION

ADDITIONS TO THE EXISTING CHARGES

1. Provision of Trucks for the use of Traders when not included in the conveyance rate. 50 per cent. with a minimum charge of 9d. per ton.

2. Collection or Delivery of Merchandise conveyed by Merchandise train. 1s. 6d. per ton for Collection, 1s. 6d. per ton for Delivery, in addition to the percentage increases of, and flat rate additions to, any "Collected" and/or "Delivered" rate.

3. Cloak Rooms Minimum charge per article—2d.

In cases where any addition to the existing Toll, Rate or Charge involves a fraction of a penny in the Toll, Rate or Charge to be charged under this Schedule the fraction, if less than one halfpenny, shall not be charged, and if the fraction be one halfpenny or more it shall be charged as one penny.

APPENDIX VI

THE MINISTRY OF TRANSPORT ACT, 1919

THE RAILWAY AND CANAL TRAFFIC ACT, 1888

THE RAILWAY COMPANIES OF GREAT BRITAIN

NOTICE OF INCREASE OF TOLLS, RATES, AND CHARGES

NOTICE IS HEREBY GIVEN pursuant to the Railway and Canal Traffic Act, 1888, and the Order of the Board of Trade thereunder dated the 25th day of January, 1889 (so far as they may apply), that the Minister of Transport in pursuance of his powers under the Ministry of Transport Act, 1919, has directed the Railway Companies of Great Britain, and such Railway Companies accordingly intend to increase the Tolls, Rates and Charges published in the Books required by Act of Parliament to be kept for public inspection to the extent and in the manner undermentioned, and that the altered Tolls, Rates and Charges are to come into force on the 1st day of September, 1920.

The Notice of Increase of Tolls, Rates and Charges dated the 29th day of December, 1919, is hereby rescinded as from the 31st day of August, 1920.

For and on behalf of the Railway Companies of Great Britain.

P. H. PRICE, *Secretary*,

Railway Clearing House, London.

Dated the 16th day of August, 1920.

SCHEDULE OF TOLLS, RATES AND CHARGES TO BE CHARGED ON AND FROM THE 1ST SEPTEMBER, 1920

PART I

DESCRIPTION OF MERCHANDISE, ETC.

1. Coal, Coke, and Patent Fuel
2. Merchandise (other than Coal and Coke) in Class A of the General Railway Classification.
3. Merchandise (other than Patent Fuel) in Class B of the General Railway Classification.
4. Merchandise in Class C of the General Railway Classification.
5. Merchandise in Classes 1 to 5 of the General Railway Classification.

TOLLS, RATES AND CHARGES TO BE CHARGED

The tolls, rates and charges in operation on the 14th January, 1920, with the under-mentioned additions thereto—
 100 per cent. plus a flat rate of 6d. per ton, irrespective of distance, subject to a maximum addition of 4s. per ton.
 100 per cent. plus a flat rate of 6d. per ton, irrespective of distance, subject to a maximum addition of 4s. per ton.
 100 per cent. plus a flat rate of 6d. per ton, irrespective of distance.
 100 per cent. plus a flat rate of 9d. per ton, irrespective of distance.
 100 per cent. plus a flat rate of 1s. per ton, irrespective of distance.

100 per cent. plus a flat rate of 6d. per ton, irrespective of distance.
 100 per cent. plus a flat rate of 2s. per truck, or part truck, irrespective of distance.
 100 per cent.
 150 per cent.
 100 per cent.
 75 per cent.

The existing charges with an addition thereto of 16½ per cent.
 and not hereinbefore provided for, to be increased by 100 per cent.

MODIFICATIONS AND EXCEPTIONS

DESCRIPTION OF MERCHANDISE, ETC.

(a) Manure in bulk, packed Manure, Basic Slag and Lime, conveyed by Merchandise train in minimum loads of 2 tons, for use as agricultural manure in the United Kingdom.

(b) Bicycles conveyed by Passenger train, or other similar service

(c) Children's Folding Mailcarts (accompanied) conveyed by Passenger train, or other similar service.

(d) Children's Non-folding Mailcarts and Perambulators conveyed by Passenger train, or other similar service—
 (i) Accompanied

(ii) Unaccompanied

(e) Typewriting Machines conveyed by Passenger train

TOLLS, RATES AND CHARGES TO BE CHARGED

The rates in operation on the 14th January, 1920, with an addition of 50 per cent. plus the flat rates applicable and hereinbefore specified, irrespective of distance.
 Accompanied. Unaccompanied.
 "Owner's "Company's "Owner
 Risk." Risk." Risk."

For a distance—	Each.	Each.	Each.
Not exceeding 12 miles	1/3	2/	1/6
" 25 "	1/3	3/	2/4
" 50 "	2/	4/	3/
" 100 "	3/6	7/	5/6
" 200 "	5/3	10/6	7/9
Exceeding 200 miles, for each additional 50 miles, or part thereof.	9/	2/	1/6

The rates in operation on the 1st March, 1917, with an addition of 100 per cent.

Twice the amount of the rates specified in this Schedule for accompanied Children's Folding Mailcarts conveyed by Passenger train, or other similar service.

The rates specified in this Schedule for unaccompanied Bicycles conveyed by Passenger train, or other similar service, with an addition of 50 per cent.

The charges which the Company may be entitled to charge for the carriage of such machines, when accompanying a passenger, shall be modified and charged as mentioned hereunder. Such charges shall be applicable only to a single machine required for the passenger's personal use and carried at "Owner's Risk."

For a distance not exceeding 30 miles, and irrespective of the weight of the machine—

Not exceeding 6 miles	Each.
" 12 "	4/
" 20 "	8/
" 30 "	1/0
" "	1/6

For a distance above 30 miles, when the machine does not exceed the following weights—

	lbs. 10	lbs. 15	lbs. 20	lbs. 30	lbs. 40
Not exceeding 50 miles	Each. 1/9	Each. 2/1	Each. 2/3	Each. 2/3	Each. 2/3
" 100 "	" 1/9	" 2/1	" 2/6	" 3/6	" 3/6
" 200 "	" 1/9	" 2/4	" 3/6	" 4/6	" 5/7
" 300 "	" 1/9	" 3/	" 4/6	" 6/	" 7/
Exceeding 300 miles	" 1/9	" 3/	" 4/6	" 6/	" 8/6

(f) Sewing Machines (accompanied) conveyed by Passenger train.

The rates in operation on the 1st March, 1917, with an addition of 100 per cent. "At Co.'s "At Owner's Risk."

(g) Comptometers, Dictating Machines, Small Portable Weighing Machines and other similar articles (accompanied) conveyed by Passenger train.

	lbs. 10	lbs. 15	lbs. 20	lbs. 30	lbs. 40
For a distance not exceeding 30 miles	Each. 1/9	Each. 2/1	Each. 2/3	Each. 2/3	Each. 2/3
" 50 "	" 1/9	" 2/1	" 2/6	" 3/6	" 3/6
" 100 "	" 1/9	" 2/4	" 3/6	" 4/6	" 5/7
" 200 "	" 1/9	" 3/	" 4/6	" 6/	" 7/
" 300 "	" 1/9	" 3/	" 4/6	" 6/	" 8/6
For a distance exceeding 300 miles, for each additional 50 miles or part thereof.	" 1/9	" 3/	" 4/6	" 6/	" 8/6

PART II

DESCRIPTION OF MERCHANDISE, ETC.

Merchandise and Live Stock conveyed between Great Britain and Ireland.

TOLLS, RATES AND CHARGES TO BE CHARGED

The through rates or charges in operation on the 14th January, 1920, for the conveyance of traffic between Great Britain and Ireland, with the additions specified in this Schedule, and also the following further additions for the conveyance of such traffic by railway to or from the Irish Ports—

	Class C. per ton.	Classes 1-5. per ton.
For a distance in Ireland—		
Not exceeding 20 miles	" 1/	" 1/9
" 40 "	" 1/3	" 2/6
" 60 "	" 1/9	" 3/3
Exceeding 60 "	" 2/	" 4/

Provided that, where any through rate or charge between Great Britain and Ireland was not included in the general 4 per cent. increase of tolls, rates and charges in 1913, such through rate or charge shall, subject to any statutory maxima, but irrespective of any limitation contained in the Great Southern and Western and Waterford and Central Ireland Railway Companies Amalgamation Act, 1900, or the Great Southern and Western and Waterford, Limerick and Western Railway Companies Amalgamation Act, 1900, be increased by 4 per cent., and that where the proportion of any controlled Irish Railway Company in any such through rate or charge was not subject to the 10 per cent. increase of tolls, rates and charges in 1916, such proportion of the through rate, or charge, plus the said 4 per cent. increase, if any, shall, subject to any statutory maxima, but irrespective of any such limitation as aforesaid, be further increased by 10 per cent. before the foregoing additions shall be made thereto.

Merchandise	to be changed in respect of the sea transit shall be as follows—	10/ per ton.
Horses, Mules and other beasts of burden	•	•
Cattle and Calves	•	•
Pigs, Sheep, and Goats	•	5/ "
Lambs and other small Animals	•	2/ "
	•	1/ "

DESCRIPTION OF SERVICE OR ACCOMMODATION

1. Provision of trucks for the use of Traders, where not included in the conveyance rate.
2. Collection or Delivery of Merchandise conveyed by Merchandise train.

The tolls, rates and charges in operation on the 14th January, 1920, with the under-mentioned additions thereto—
100 per cent. with a minimum charge of 9d. per ton.

1s. 6d. per ton for Collection, and 1s. 6d. per ton for Delivery, in addition to the percentage increases of, and flat rate additions to, any Collected and/or Delivered rate.
50 per cent., with a minimum charge of 3d. for the deposit of each article or package.

If any increased Toll, Rate or Charge, made in pursuance of this direction, includes a fraction of a penny, the fraction, if less than $\frac{1}{4}$ d., shall not be charged, or if the fraction amounts to $\frac{1}{4}$ d., but is less than 1d., it shall be charged as 1d.

APPENDIX VII

RAILWAY NOTICE

TEMPORARY REDUCTION OF RATES

NOTICE IS HEREBY GIVEN that on and from 1st January, 1922, the Railway Companies of England and Wales, as an experimental arrangement, intend to reduce the Rates on the undermentioned traffics conveyed by Merchandise Trains, and that as from that date until 31st December, 1922, the Rates in operation on 14th January, 1920, published in the books required by Act of Parliament to be kept for public inspection, will be subject to the modified increases shown below—

DESCRIPTION OF MERCHANDISE, ETC.

RATES TO BE CHARGED

		The rates in operation on the 14th January, 1920, with the undermentioned additions thereto—	
		75 per cent. plus a flat rate addition of 4d. per ton irrespective of distance, subject to a maximum addition (including percentage and flat rate) of 4s. per ton.	75 per cent. plus a flat rate addition of 4d. per ton irrespective of distance, subject to a maximum addition (including percentage and flat rate) of 4s. per ton.
1.	Coal, Coke and Patent Fuel	75 per cent. plus a flat rate addition of 4d. per ton irrespective of distance, subject to a maximum addition (including percentage and flat rate) of 4s. per ton.	75 per cent. plus a flat rate addition of 4d. per ton irrespective of distance.
2.	Limestone for Chemical Works	75 per cent. plus a flat rate addition of 4d. per ton irrespective of distance, subject to a maximum addition (including percentage and flat rate) of 4s. per ton.	75 per cent. plus a flat rate addition of 4d. per ton irrespective of distance.
3.	Lime in Class "B" of the General Railway Classification, for Iron and Steelmaking.	75 per cent. plus a flat rate addition of 4d. per ton irrespective of distance.	75 per cent. plus a flat rate addition of 4d. per ton irrespective of distance.
4.	Iron and Steel in Class "B" of the General Railway Classification.	75 per cent. plus a flat rate addition of 4d. per ton irrespective of distance.	75 per cent. plus a flat rate addition of 4d. per ton irrespective of distance.

† NOTE.—In the case of rates noted for this traffic as inclusive of Collection and/or Delivery, the present addition of 1s. 6d. per ton for Collection and 1s. 6d. per ton for Delivery will be made in addition to the percentage increase and flat rate addition.

The charge for Wagon Hire, when not included in the conveyance rate, will remain unaltered.

If the modified increased rate includes a fraction of one penny, the fraction if less than one halfpenny will not be charged, but if the fraction amounts to one halfpenny but is less than one penny, it will be charged as one penny.

The rates charged will apply with the same conditions as the existing rates.

These modifications do not apply to traffic to, from, or between places on Scottish Railways, nor to traffic to, from or between places in Ireland,

BY ORDER.

RAILWAY CLEARING HOUSE,

December, 1921.

APPENDIX VIII

RAILWAY NOTICE

REDUCTION OF RATES

NOTICE IS HEREBY GIVEN that on and from 22nd May, 1922, the Railway Companies of England and Wales, as an experimental arrangement, intend to reduce the Rates on the undermentioned traffics conveyed by Merchandise Trains, and from such date until 31st December, 1922, the Rates in operation on 14th January, 1920 (except Rates operating for specified periods, which periods have expired since the 14th January, 1920, or Rates which are in force under the terms of special Agreements), published in the books required by Act of Parliament to be kept for public inspection, will be subject to the modified increases shown below—

DESCRIPTION OF MERCHANDISE

RATES TO BE CHARGED

DESCRIPTION OF MERCHANDISE	RATES TO BE CHARGED	The Rates in operation on the 14th January, 1920 (subject to the exceptions referred to above), with the undermentioned additions thereto—
1. Coal, Coke, and Patent fuel	{ Percentage Increases TO REMAIN AT 75 per cent. Flat Rate TO BE FURTHER REDUCED from 4d. per ton to 3d. per ton. Maximum Addition TO BE REDUCED from 4s. per ton to 3s. 6d. per ton. (3s. per ton where now applicable to be retained).
2. Traffic in Class A of the General Railway Classification (other than Coal and Coke)—		

DESCRIPTION OF MERCHANDISE	RATES TO BE CHARGED	The Rates in operation on the 14th January, 1920 (subject to the exceptions referred to above), with the undermentioned additions thereto—
Iron Ore, Ironstone and Limestone.		
Burnt Iron Pyrites		
Cinders		
Hammer Scale		
Manganiferous Iron Ore		
Mill Cinder		
Mill Scale		
Puddle Tap		
Purple Ore		
Manure in bulk when for use as Agricultural Manure in England and Wales and so consigned.		
Traffic in Class A other than above.		

Percentage Increase TO BE FURTHER REDUCED from 75 per cent. to 50 per cent.
Flat Rate TO REMAIN at 3d. per ton.
Maximum Addition TO REMAIN at 2s.* per ton.

* Subject to the provisions of clause 7(b) hereof.

Percentage Increase TO REMAIN at 50 per cent.
Flat Rate TO BE REDUCED from 6d. per ton to 3d. per ton.
Maximum Addition TO REMAIN at 4s. per ton.
Percentage Increase TO BE REDUCED from 100 per cent. to 75 per cent.
Flat Rate TO BE REDUCED from 6d. per ton to 3d. per ton.
Maximum Addition TO REMAIN at 4s. per ton.

APPENDIX VIII—(continued).

3. Traffic in Class B of the General Railway Classification (other than Patent Fuel)—

Iron and Steel	{	For Blast Furnaces and Steel Works.	{	Percentage Increase to REMAIN at 75 per cent. Flat Rate to BE FURTHER REDUCED from 4d. per ton to 3d. per ton. Increase to BE LIMITED to a maximum of 6s. per ton.
Chrome Iron Ore				
Manganese Ore				
Lime for iron and Steelmaking.				
Basic Material				
Burnt Limestone				
Calcin'd Dolomite Limestone.				
Ferro Silicon				
Ferro Manganese				
Manure in bulk, Basic Slag and Lime in bulk when for use as Agricultural Manure in England and Wales and so consigned.				
Traffic in Class B other than above				
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7. (a) The charge for Wagon Hire, when not included in the conveyance rate, will remain unaltered.

(b) In the case of Rates for Iron Ore and the other traffics for Blast Furnaces and Steel Works, to which a maximum addition of 2s. 0d. per ton applies, the charge for Wagon Hire, whether recorded separately or included in a Company's Wagon Rate, will be subjected to the present increase, viz., 100 per cent. The maximum addition of 2s. 0d. per ton (where applicable) will accordingly be added to the Company's Wagon Rate less the amount included therein for Wagon Hire, and the Wagon Hire plus 100 per cent. will be added thereto.

8. If the modified increased Rate includes a fraction of one penny, the fraction if less than one half-penny will not be charged, but if the fraction amounts to one halfpenny but is less than one penny, it will be charged as one penny.

9. The Rates charged will apply with the same conditions as the existing Rates.

10. These modifications do not apply to traffic to, from or between places on Scottish Railways, nor to traffic to, from or between places in Ireland, and the Isle of Man, except that in the case of through traffic with these places the additional charge for Collection or Delivery at the English or Welsh Station will be reduced from 1s. 6d. per ton to 9d. per ton.

BY ORDER,

RAILWAY. CLEARING HOUSE,

May, 1922.

APPENDIX IX

REDUCTIONS IN RAILWAY RATES FOR TRAFFIC CONVEYED BY MERCHANDISE TRAINS

We are informed by the English Railway Companies that they have decided to make further reductions in their charges, and that on and from 1st August next the rates for the undermentioned traffics will be modified as indicated.

DESCRIPTION OF MERCHANDISE, ETC.

RATES TO BE CHARGED

The rates in operation on 14th January, 1920 (except rates operating for specific periods, which periods have expired since 14th January, 1920, or rates which are in force under terms of special agreements), with the undermentioned additions thereto—

{ Percentage Increase to be further reduced from 75 per cent. to 60 per cent.
 { Flat rate to be further reduced from 3d. per ton to 2d. per ton.
 { Maximum addition to remain at 3s. 6d. per ton. (3s. per ton where now applicable to be retained.)

DESCRIPTION OF MERCHANDISE, ETC.	For Blast Furnaces and Steel Works.	
1. Coal, Coke, and Patent Fuel		
2. The following Traffics in Class A of the General Railway Classification (other than Coal and Coke)— Iron Ore, Ironstone and Limestone. Burnt Iron Pyrites. Cinders. Hammer Scale Manganiferous Iron Ore. Mill Cinder. Mill Scale. Puddle Tap. Purple Ore.		
3. Manure packed, and Lime packed, in Class C, in loads of 21 tons and upwards, when for use as Agricultural Manure in England and Wales and so consigned.		{ Percentage Increase to remain at 50 per cent. { Flat rate to be reduced from 9d. per ton to 4d. per ton.
4. Iron and Steel in Class C of the General Railway Classification.		{ Percentage Increase to remain at 75 per cent. { Flat rate to be further reduced from 6d. per ton to 4d. per ton.
5. Traffic in Class C of the General Railway Classification other than the above.		{ Percentage Increase to be reduced from 100 per cent. to 75 per cent. { Flat rate to be reduced from 9d. per ton to 4d. per ton.
6. Traffic in Classes 1 to 5 of the General Railway Classification.		{ Percentage Increase to be reduced from 100 per cent. to 75 per cent. { Flat rate to be reduced from 1s. per ton to 6d. per ton.
7. Rolling Stock		{ Percentage Increase to be reduced from 100 per cent. to 75 per cent. { Flat rate to be reduced from 6d. per ton to 4d. per ton.
8. Live Stock at Truck Rates		{ Percentage Increase to be reduced from 100 per cent. to 75 per cent. { Flat rate to be reduced from 2s. per truck, or part truck, to 1s. per truck, or part truck, irrespective of distance.
9. Live Stock at Head Rates		{ Percentage Increase to be reduced from 100 per cent. to 75 per cent.
10. Small Parcels (as defined in Part VI of the Railway Rates and Charges Orders).		{ Percentage Increase to be reduced from 150 per cent. to 100 per cent.
11. Returned Empties		{ Percentage Increase to be reduced from 100 per cent. to 75 per cent.

RAILWAY CLEARING HOUSE,
 12th July, 1922.

APPENDIX X

THE MINISTRY OF TRANSPORT'S ORIGINAL OUTLINE OF RAILWAY POLICY

THE following is a copy of the White Paper in which the Ministry of Transport foreshadowed the 1921 Act, and outlined its policy for the future regulation of railways by the State—

RAILWAYS

GROUPING.

It is proposed that the railways of Great Britain should be formed into a limited number of groups, say, five or six for England and Wales, and one for Scotland. The Irish railways naturally fall to be dealt with under the new legislation in regard to Ireland. The groups will be determined on the basis of operating economy, and all direct competition between the groups will, as far as possible, be eliminated. The groups which it is proposed to form are roughly—

1. *Southern*, combining the South Eastern and Chatham, the Brighton, and the South Western.

2. *Western*, the present Great Western system with the Welsh lines.

3. *North Western*, combining the North Western, the Midland, and the Lancashire and Yorkshire, North Staffordshire, and Furness.

4. *Eastern*, combining the Great Northern, the Great Central, and the Great Eastern.

5. *North Eastern*, the present North Eastern system and the Hull and Barnsley.

6. *London Group* (local lines) ;

and a

Scottish Group for the whole of Scotland.

In each case the new group would absorb the smaller and independent broad gauge lines within its area, but railways which may be classified as "light," whether existing or future, will be wholly excluded from this grouping arrangement, and proposals with regard to these light railways are indicated later.

It is hoped that the amalgamation of companies in the respective groups will be carried out voluntarily ; but as the scheme depends on the amalgamations, powers will be sought in a future Transport Bill to compel amalgamations (on terms, failing agreement, to be settled by some tribunal) in any cases where they are not voluntarily completed in a reasonable time to be specified.

It is recognized that a more logical grouping of the existing systems might result if regard were had exclusively either to geographical or to operating considerations ; but the amalgamation of complete undertakings as the initial step will avoid many of the difficulties which would arise if undertakings had to be divided. It would be open to the new group companies to exchange between themselves lines which project from the territory of one group into that of another, and at a later stage it may become necessary to require them to do so.

MANAGEMENT.

Each of the grouped railways will require a Board of Management, and in order to secure efficiency and uniformity, and avoid undue cost, the number of members comprising the Board should be limited to probably 21. The composition of the Board is considered to be of the greatest importance, and whilst in the past the directors of railway companies have all been appointed by the shareholders, the Government are of opinion that the time has arrived when the workers—both officials and manual workers—should have some voice in management.

The Board of Management should, in the opinion of the Government, be composed of representatives—

(a) of the shareholders, who should form a majority on the Board, and of whom a proportion should hold large trading interests ; and

(b) of employees, of whom one-third might be leading administrative officials of the group, to be co-opted by the rest of the Board, and two-thirds members elected from and by the workers on the railway.

FINANCE.

The Act of Parliament should lay it down that rates and fares shall be fixed at such a level as, with efficient and economical management, will in the opinion of a prescribed authority enable railway companies to earn a net revenue substantially equivalent, on some pre-war basis to be settled in the Act, to the combined net revenue of all the companies absorbed in the group. With due care and economy it should be possible for group companies to improve on their pre-war return ; but, in that event, the Government is of opinion that such surplus revenues should not accrue entirely to the companies. The State would be very materially extending the "charter" of the companies and is entitled to participate in such surplus revenues, and settlement of a suitable sliding scale to regulate their division presents no insuperable difficulty.

DEVELOPMENT FUND.

It is not contemplated that the Government's share of the surplus revenues should be thrown into the general revenue of the country. Much development work has to be done which is beyond the financial resources of the localities, and the intention is that the Government's share of these surplus profits should be funded for development purposes, to assist backward districts, to develop light railways, and for other appropriate purposes in connection with transportation, as may be approved by Parliament in the Act.

RATE-FIXING MACHINERY.

The financial stability of the groups on the one hand, and reductions of rates on the other, can, in the opinion of the Government, only be assured if there is adopted a procedure for fixing rates which, whilst being flexible, will command the confidence of railways and traders. The Statutory Rates Advisory Committee is now engaged upon a systematic review of railway rates and charges, the principles upon which they are to be fixed, the machinery by which they shall be governed, and the Committee's reference will later be extended to cover fares.

The machinery for dealing with the railway rates and charges of the country is generally admitted to rest upon an unsatisfactory basis; but it is hoped to place the whole system of rates and charges upon a sound footing after the Rates Advisory Committee has reported.

The first object of the revision will be to secure financial equilibrium to the railways of Great Britain as a whole, and it is anticipated that, having regard to the size and diversity of traffic conditions in each group, the revision in aiming at this result will also secure an approximate equilibrium within each of the proposed groups. If, however, revenue were not obtained at least equal to the basic revenue agreed upon, the procedure contemplated is that the Rates Advisory Committee—or whatever body may be appointed to exercise its functions—should be asked to consider modifications in the scheme and to make recommendations to the Minister as to-day.

It is not possible at this stage to indicate in detail what machinery should be set up for dealing with appeals from traders on railway rates. The Rates Advisory Committee is conducting an exhaustive inquiry, and the Government must await their report before it can embody any proposals in a Bill.

The Government does not propose to give to the companies any financial guarantee. It proposes to set up a flexible rates machinery, which will enable appropriate charges to be levied, and to leave the railway companies to rely upon this machinery for the maintenance of the financial position of the groups at the level agreed.

The earnings of the companies must, of course, be subject to the normal fluctuations of traffic, and to the express stipulation that the undertakings are being managed with due care and economy. This stipulation is considered essential to the protection of the public; but on the other hand it is proposed to grant to the companies a right of appeal to a judicial tribunal if the Minister of Transport refused, upon their application, to put the machinery for revising rates in motion.

WAGES AND WORKING CONDITIONS.

It is proposed to provide by the Bill for a permanent machinery to deal with questions of railway wages and working conditions, on the lines of the two Boards which have been established temporarily by agreement, namely, the Central Wages Board, consisting of equal numbers of managers and men with an appeal to the National Wages Board, consisting of four managers, four men, and four users of the railway, with an impartial chairman.

FUTURE POWERS OF THE STATE IN RELATION TO RAILWAYS.

It will be proposed to confer certain powers upon the State in relation to railways. These powers may be conveniently grouped under the following headings—

- (a) For the protection of the public.
 - (b) For the economical working of the railway systems of the country.
 - (c) To safeguard the national interests.
- (a) *For the Protection of the Public.*
- (1) The State would have the right to require adequate services and adequate facilities, including minor extensions in the geographical

area which it is proposed to allot to each group company. A group company should, however, have a right of appeal to a tribunal to be prescribed if it contends that the requirement involves a capital expenditure which would seriously interfere with its finances.

(2) Subject to the same right of appeal, the State should have power to require alterations, improvements, and additions necessary for public safety.

(b) *For the Economical working of the Railway Systems of the Country.*

(1) In order to obtain the best standards of permanent way, rolling stock, plant, and equipment which are necessary to secure the financial returns to the groups and yet keep railway rates as low as possible, the State must (subject to a similar right of appeal by the companies) have the power to impose such standards.

(2) The State ought to have the right to require co-operative working, including granting of running powers, common user of rolling stock and facilities on equitable terms, the pooling of traffic and receipts where competition is causing waste, and the common user of workshop and manufacturing plant.

(3) In order that the public may know, and the Government be in a position to judge of the working of the railways, the Ministry should have full power to prescribe the form of accounts, to regulate the manner in which they are compiled, and to require the compilation of such statistics and returns as are, in the opinion of the Minister, necessary, with a right of inspection.

(c) *To Safeguard the National Interests.*

The railways should be required to submit for approval their proposals involving capital expenditure and also their plans for raising capital required.

It is necessary in view of the fact that the State is to provide machinery for adjusting rates intended to produce a certain net result, that the State should approve, and, if necessary, have power to require, adequate reserves for depreciation and renewals to be made before dividends are issued. This again should be subject to a right of appeal to the prescribed tribunal.

LIGHT RAILWAYS

It is proposed to exclude light railways from the grouping arrangements. Light railways must rely largely for their prosperity and development upon the goodwill and assistance of the main-line companies in whose districts they lie. It is essential that the main-line companies should have no grounds for fearing competition from an ambitious light railway company, or combination of light railway companies. It should, therefore, be provided that where a group railway can prove to the satisfaction of the Ministry of Transport that the light railway is changing in character and is, in fact, becoming an ordinary railway, or is competing for main-line traffic, the group company may absorb the light railway on fair terms, and make it a part of its own system.

In so far as traffic for which transport facilities are required justifies the provision of standard gauge lines operating more or less under the same conditions as lines owned by main-line companies, the Minister should have power to insist that the group companies should provide

the lines which are necessary. Different considerations apply to light railways, *i.e.*, lines of much lighter construction with less onerous conditions of operation attached to them, constructed wherever possible along the verge of roads and subject to less stringent regulations than is the case with regard to normal railways.

The construction and management of light railways of this description should be in the hands of separate undertakings.

If this means of transport is to be developed for the benefit of agriculture and other industries, the State must encourage private enterprise or local authority enterprise by some financial assistance in the construction and development of light railways throughout the country. The policy of grouping light railway systems so far as possible as a means of securing economy in management, maintenance, repairs, etc., is considered wise, and experience has already shown that this can be done successfully.

It should be the policy of the Ministry to stimulate the development of light railways constructed, equipped, and worked on the cheapest possible lines. It may be found that the present procedure under the Light Railway Acts, by which powers to construct light railways are sought and granted, may require to be modified.

DOCKS

The Government have no present intention of altering the status of the dock undertakings of the country, but some of the temporary powers conferred upon the Minister of Transport by the Ministry of Transport Act, 1919, in connection with non-railway owned docks, should, in their opinion, be retained and extended to railway-owned docks.

CANALS

The future of canals involves questions of great difficulty and complexity. The best advice available is being sought, and the whole subject is about to be investigated by a Committee which has been set up under the chairmanship of Mr. Neville Chamberlain, M.P., and pending the receipt of the report of this Committee, the Government feel that they are not in a position to formulate a policy.

APPENDIX XI

THE CLASSIFICATION OF MERCHANDISE

SOME EXAMPLES OF THE CLASSES IN WHICH VARIOUS KINDS OF GOODS ARE PLACED

CLASS 1.—Cinders containing iron, to blast furnaces; cinders and ashes for road repairs or waste tips; chalk e.o.h.p. in bulk; gas water or liquor in owners tank wagons, 8 tons per truck; limestone in bulk; ore iron and purple; pyrites; slag for road repairs or waste tips.

CLASS 2.—Basic slag unground; bricks; brine; cinders and ashes for concrete, etc., making; iron oxide waste; lime, carbonate of, and sulphate of, waste in bulk; manure in bulk; ore; chrome, iron, manganese and manganiferous iron; sand in bulk; shale, bituminous; stone, wholly undressed as quarried e.o.h.p.; tar.

CLASS 3.—Ammoniacal liquor in owner's tank wagons, 8 tons per truck; lime in bulk; magnesite in bulk or sacks; road-making material tarred, e.o.h.p.

CLASS 4.—Copperas, green in bulk; creosote; dust layers; salt in bulk or sacks; rock.

CLASS 5.—Asphalt; bricks, unglazed; cinders and scrapings from brass furnace fireholes; gas water or liquor in casks or iron drums; ore, lead and spelter; pig iron; scrap iron and steel; slates, roofing; stone blocks sawn or roughly wrought.

CLASS 6.—Ammoniacal liquor in casks or iron drums; bars iron or steel (not crucible steel); clay china; lead scrap ashes and skimmings; lime in sacks; moulds, iron and steel; shell blanks (ordnance); spelter scrap, ashes and skimmings; tin scrap, scimmings; zinc oxide, crude.

CLASS 7.—Anchors, iron or steel; axles, iron or steel; bones or bone waste not ground or prepared; cables, chain, iron, or steel; electric tramway poles and fittings; hoop iron or steel; leather cuttings and shavings for manure manufacture; manure packed e.o.h.p.; oils, not flashing below 150 deg. Fah.; ore, copper; pipes, iron or steel for gas or water mains; pit props, iron or steel; rails, iron or steel; tubes and fittings, iron or steel; tyres, iron or steel in the rough.

CLASS 8.—Bolts and nuts, iron or steel; brass scrap, metalliferous dirt containing not more than $\frac{1}{2}$ copper; castings, iron and steel, not machined; chemicals as listed; copper scrap, metalliferous dirt not exceeding $\frac{1}{2}$ copper; electric cable junction boxes; grain, whole, as listed; horse shoes; lead, pig; nails and spikes, iron and steel; oil cake; plates, armour; spelter cast not machined in ingot plate or bar; starch; terra-cotta ware; wire, iron or steel; wood pulp.

CLASS 9.—Antimony, crude; bark for tanning, etc.; bones, calcined; hoops, iron or steel; head plates, waste from accumulators; lime, acetate of, etc.; marble in blocks rough; ore, antimony; sacks, old; sails, old; slates, asbestic; stamping and pressings, iron or steel undamageable not less than $\frac{3}{16}$ thick; telegraph poles and stores as specified; wagons, railway e.o.h.p. loaded in other wagons.

CLASS 10.—Boards, thin in bundles for picture backs; clog blocks, rough; crane: work, jibs and girders; firewood, prepared; flower

pots, unglazed ; hay and straw, $2\frac{1}{2}$ tons per truck ; laths, wood in bundles ; millstones, rough ; oils as listed not flashing below 150 deg. Fah. ; ore, nickel and tin ; paraffin wax and scale in owner's tank wagon in 8 ton lots ; plough parts ; sinks, fireclay or stoneware ; tubes, sanitary ; tyres, solid rubber ; wood pailing.

CLASS 11.—Ale and porter in casks or cases ; candles and tapers ; copper, matte and regulus ; fruit pulp ; lead oxide, etc. ; oils, hardened of various kinds in casks or drums ; ordnance (heavy guns) ; paper, printed ; spelter wrought in plate, rod, strip, or bar ; springs, cart, iron or steel ; sugar.

CLASS 12.—Bottles and bottle stoppers ; glass, common ; brass, cast in bar, ingot, or plate ; copper scrap metalliferous dirt not more than half copper ; fuel economizers ; insulators, electric ; machines and machinery ; paper, corrugated ; skins, hides or pelts for leather making ; underframes and bogies, tramcar.

CLASS 13.—Antimony, metallic in bars, etc. ; battery parts ; borax ; brake drums for motor-cars ; brass, wrought in bar, plate, rod, and strip ; bronze, cast not machined in bar ingot or plate ; cages, pic ; copper, cast not machined in bar, ingot, or plate ; cotton, raw ; ice ; jacks, lifting ; ladders, iron or steel ; mantelpieces, slate ; sheets, steel coated with brass or copper ; timber, rough sawn ; tin concentrates ; varnish, black not flashing below 150 deg. Fah.

CLASS 14.—Bacon and hams ; bolts and nuts, brass ; bronze scrap ; butter in casks or cases ; machines and machinery, certain kinds as specified ; rivets, brass and spelter ; tape lead ; washers, brass, lead, and spelter.

CLASS 15.—Boilers, engine, furnace and kitchen ; bronze, cast not machined, hollow blooms, and wrought in bar, plate, rod or strip ; coffee ; copper, cast hollow blooms or wrought in bar, plate, rod or strip ; dyes and colours ; glue ; grease ; hay and straw ; lead chromate ; leather, undressed in bundles ; paints and colours in casks, iron drums, or in tins in cases ; tar stills ; tobacco leaf ; tubes (constructional iron work exceeding 3 ft. 6 in. in diameter) ; yarn, twist, or weft (coir, cotton, hemp, jute, linen, ramia or tow).

CLASS 16.—Accumulators, dry ; acids (as specified) ; aeroplane parts ; aluminium and alloys, cast ; asbestos board ; axle boxes, brass ; battery parts ; bedsteads (metallic in cases or crates) ; blocks, glass for pavements ; boot and shoe protectors and studs ; buckets ; bunks, ship, iron or steel ; cable, electric ; cans, milk ; carriage or wagon bodies, railway ; cartridge cases, exploded ; chains, cycle, packed ; cotton, felted or pulp ; cotton banding for driving spindles ; dust bins, galvanized ; electric trucks ; electrodes ; emery ; essences ; fruit ; fenders ; files and rasps ; flocks ; forks, digging ; frames, window, iron or steel ; gas plant, suction ; gates, iron, steel, or wood ; hoe heads, holloware, cast iron, or steel ; ink, insulators ; ivory, vegetable ; leather, heavy mechanical ; engines, steam, hydraulic, or internal combustion ; machines and machinery as specified ; metals, white antifriction ; nails ; netting, iron or steel wire ; nickel and alloys, cast not machined in bar, ingot, or lump ; paper (as listed) ; pewter in bars or ingots ; preserves, fish, fruit, meat, provisions, jam or marmalade ; safes, iron or steel ; screens, or tips, colliery ; tin, cast not-machined in bar or ingot ; tin foil ; tubes of bronze, copper, or zinc ;

twine ; tyres, solid rubber on rims ; varnish, black, not flashing below 150 deg. Fah. ; vices, iron or steel ; wheels, for motor vehicles ; wire, bronze and copper ; wool, raw.

CLASS 17.—Aluminium and alloys, wrought ; belts, driving ; forgings, brass or bronze ; nickel and alloys, wrought ; sheets zinc, nickelled ; tin, wrought ; wines in casks ; wire, cotton covered ; yarn, silk veil.

CLASS 18.—Basins and stands, lavatory, earthenware ; baths, packed ; beds and bedding ; bicycle frames, accessories, tyres, and wheels ; boots and shoes ; brooms and brushes ; buttons, other than metal ; clock dials ; coin, copper or bronze ; curtains, cotton net ; drapery, mixed ; evaporating plant ; fire extinguishers ; floor cloth and oil cloth ; frames, garden ; desks, school ; glass, plate, polished ; golf balls ; guns, machine ; hardware in brass, bronze, and copper ; hawsers ; looking glasses ; machines and machinery ; organs, parts of ; pumps, air ; harness and harness furniture ; safety fuzes ; sparking plugs ; tubes, aluminium or alloys ; vulcanite and ebonite ; wheelbarrows ; wire, aluminium and alloys.

CLASS 19.—Bedsteads, wooden ; boilers, copper or brass ; casts, plaster for ceiling ornamentation ; cigarettes ; dentists sundries ; firearms ; frames, door, and doors made of mahogany or other expensive timber ; lace, not silk ; lithographic stones ; marble, carved, in cases ; stone, decorative carved ; tobacco, manufactured ; wire, insulated.

CLASS 20.—Aeroplanes, packed ; animals, stuffed in cases ; barometers ; bicycles and tricycles, unpacked ; cigars ; cinematograph instruments ; embroidery, silk ; furniture, antiques or as detailed ; glass, cut, plate, and silvered ; gramophones and records ; lace, silk ; machines, addressograph, calculating, cash registering, etc. ; mantles, incandescent ; musical instruments ; optical instruments ; poultry and pigeons, alive in crates ; quicksilver ; statuary, bronze ; tables, bagatelle and billiards ; telescopes ; watch movements ; watches, common metal ; yarn, silk or containing silk.

CLASS 21.—Gold leaf, gold liquid, gold and gold articles ; gold precipitate ; Platinum and platinum articles, silver and silver articles ; silver precipitate ; statuary e.o.h.p.

NOTE.—Throughout the classification the letters e.o.h.p. mean "except otherwise herein provided."

APPENDIX XII

PREFERENTIAL RATES IN EUROPEAN COUNTRIES

THE following are extracts from the Foreign Office Reports (Cd. 8720 of 1898)—

AUSTRIA-HUNGARY.—“ Preferential rates on Austrian railways are granted principally for the following reasons : (1) To enable a line of railway with a circuitous route to compete with a more direct line which would otherwise monopolise the carriage of goods from one given point to another. (2) To enable an Austrian industry to compete with a similar industry abroad which is more advantageously situated. Thus, preferential rates are granted for this reason on Bohemian glass, beet-root, and its products and on sugar for export.” A reduction of 10 per cent. on rates is granted when sugar is exported, and of 15 per cent. in the case of iron and steel.

BELGIUM.—“ With a view to the development of the traffic along the Belgian lines of railways preferential rates are very largely granted by the Belgian Government, who now (1898) own four-fifths of the whole railway system of Belgium. Very great reductions are made in favour of all kinds of merchandise destined for Belgian ports, and these, no doubt, have very much contributed to the enormous increase which has taken place during the last few years in the shipping trade of Antwerp. These rates are mostly calculated on a differential scale ; the cost of transport decreasing per kilometre in proportion with the distance carried. . . . A series of special fixed tariffs has also been arranged with certain regular lines of steamers and also with other European countries for the direct transit of goods in order to encourage as much as possible their export as well as their import through Belgian ports.”

DENMARK.—“ . . . A grant made to the United Steamship Company of Denmark for establishing a bi-weekly service for the carriage of dairy-farm produce between Esbjerg and Grimsby destined for the Midland markets of England. The Inspector (of the Department of Agriculture) states that the agricultural interests desired that the weekly service from Esbjerg to Grimsby, which has been carried on by the United Steamship Company for the last six years should be doubled and that for this purpose a grant of 75,000 kroner (£4,166) was voted in the current year's (1898) budget. This route is now placed under Government supervision and in addition to the new bi-weekly service from Esbjerg to Grimsby it is stipulated that the company shall provide for the careful treatment of the goods. The ships on the lines are being fitted with refrigerators suited to the different descriptions of goods carried. A reduction of 20 per cent. is also made in the former freight rates. For the future the rates are to be : for one ton of butter, 16s. ; for one ton of salt meat, 12s. ; for one ton of fresh meat, 18s. ; for one ton of eggs, 20s. ; for one ton of fresh fish, 14s. It is expected that by this arrangement perishable goods destined for the Midland Counties of England will be conveyed *via* Esbjerg in greater quantities than heretofore, and will reach the consumers in better and fresher condition.”

With respect to the railway rates of Denmark, the same report gives details and says : " Your lordship will observe that many articles useful to, or produced by, agriculture are carried at a low rate, and I understand that these rates have been specially adjusted with a view to the assistance of the agricultural interest, although they cannot be termed preferential as against the products of other countries inasmuch as the charges are lowered in certain ratios to the distance carried up to 180 kilometres (about 112 miles) after which distance no further diminution is made in the rates."

FRANCE.—" The bounties given on French shipbuilding and on navigation equalled about £400,000 annually from 1890 to 1898. The Government controls railway rates and occasionally suggests certain modifications of rates."

GERMANY.—" In Oct., 1884, the Minister of Public Works addressed a letter to the Railway Council in which he laid down the conditions under which preferential tariffs should be and had been granted on the State railways. These are—

" (1) To assist agriculture and industry by granting cheap rates for raw material or subsidiary material.

" (2) To assist German manufacturers in competition with foreign importers at home and to assist German export trade abroad.

" (3) To assist German, in competition with foreign, ports.

" (4) To look after the interests of German railways and waterways in competition with those of foreign nations."

Dealing with the rates in existence the report says that " the exceptional or preferential tariffs fall under several heads of which the principal are as follows—

" (1) Exceptional or preferential tariffs, the object of which is to enable German goods to compete with foreign goods in Germany and abroad. . . ."

" In order to enable German ports to compete with the French, special tariffs are given to goods imported to Austria, Italy, and Switzerland through German ports. . . ."

" Special rates are also given to keep the traffic from passing from German to the French or Austrian lines. . . ."

A detailed table of rates in operation in Germany is prefaced by the following sentence—

" It will be seen that the local rates are 200 per cent. higher per kilometre than the preferential rates to the North Sea ports."

A BRITISH CONSUL'S LETTER.—Extract from a letter under date 23rd April, 1904, from Mr. Ralph Bernal, H.M. Consul at Stettin : " In comparing freights to and from Germany it must be remembered that the German State railways grant preferential rates on many goods sent from the interior to the coast and abroad. Thus, German coal from Silesia to Stettin pays 74 to 77 pfgs. per 100 kilos ; British coal from Stettin to Silesia pays 106 to 110 pfgs. Freight for coal, Königsgrube to Stettin, mks. 7.35 per ton ; Stettin to Königsgrube, mks. 12.40. Similar preferential rates are granted on other goods to the detriment of the competing British product, the higher freight acting practically as an extra import duty."

APPENDIX XIII

TRAFFIC ORIGINATING ON CANALS IN GREAT BRITAIN¹

	1921		1922		1923		1924		1925	
	Tons.		Tons.		Tons.		Tons.		Tons.	
Railway-owned—										
Coal, Coke, Patent Fuel, and Peat	901,425		1,042,042		1,119,586		1,135,815		956,568	
Building Materials (other than Wood)	155,459		178,711		210,032		215,034		187,665	
Manures	67,559		43,648		56,261		54,073		49,615	
Wood	19,376		51,521		57,254		63,440		68,054	
Machinery	1,870		1,502		2,083		2,219		1,928	
Raw Materials	72,580		87,680		83,354		104,813		186,855	
Industrial Products	129,597		224,718		208,628		253,017		215,588	
Agricultural Produce and Foodstuffs	253,085		167,645		180,035		214,442		190,054	
Liquids in Bulk	52,784		62,027		92,021		93,678		115,838	
Unclassified	54,812		26,336		49,660		47,402		58,510	
Total	1,708,547		1,885,830		2,058,944		2,183,933		2,030,675	
Other than Railway-owned—										
Coal, Coke, Patent Fuel, and Peat	4,718,950		6,266,159		7,087,880		7,192,540		6,599,190	
Building Materials (other than Wood)	808,207		906,571		1,057,832		1,040,841		1,171,190	
Manures	1,004,531		965,761		1,025,033		1,048,922		986,419	
Wood	139,122		220,521		209,777		228,278		264,606	
Machinery	40,959		41,775		37,508		31,419		40,944	
Raw Materials	881,404		1,165,966		1,336,994		1,411,978		1,337,843	
Industrial Products	762,403		1,066,837		1,112,015		1,235,517		1,192,937	
Agricultural Produce and Foodstuffs	1,004,021		1,174,487		1,159,532		1,237,807		1,129,621	
Liquids in Bulk	493,021		513,782		521,889		565,955		583,155	
Unclassified	323,330		386,688		256,469		278,789		234,361	
Total	10,175,948		12,708,547		13,804,929		14,272,046		13,540,266	

¹ Excluding Manchester Ship Canal.

APPENDIX XIV

MARKET PRICE OF COAL AT CARDIFF AND THE TYNE IN 1913 AND 1914

MARKET PRICE OF COALS FROM 1ST JANUARY, 1913, TO
31ST MARCH, 1914

These figures are taken from actual contracts

		Best Cardiff Steam Shipment Cardiff.	Best Durham Steam Shipment Tyne Dock.	Best Northland Steam Shipment Tyne.
1913	1 January . . .	18/6 to 18/9	16/-	15/- to 16/6
	15 " . . .	19/- " 19/6	15/6 to 16/-	15/- " 16/-
	1 February . . .	19/- " 19/6	15/- " 15/6	15/3 " 15/6
	28 " . . .	19/- " 19/6	14/6	14/6 " 15/-
	8 March . . .	19/6 " 20/-	14/9 to 15/-	15/-
	25 " . . .	19/6 " 19/9	16/- " 16/6	16/-
	1 April . . .	19/6 " 20/-	16/-	16/- to 17/-
	15 " . . .	20/6 " 21/-	16/-	15/6
	1 May . . .	21/6 " 22/-	16/-	17/-
	13 " . . .	—	15/6 to 16/-	16/6 to 17/-
	2 June . . .	22/- to 22/6	15/-	15/- " 15/3
	18 " . . .	20/6 " 21/-	14/- to 14/6	14/9 " 15/-
	1 July . . .	20/6 " 21/-	14/- to 14/6	15/- " 15/6
	15 " . . .	20/6 " 21/-	14/- " 14/6	15/- " 15/3
	4 August . . .	20/6 " 21/-	14/- " 14/3	15/6 " 15/9
	20 " . . .	20/9 " 21/3	14/- " 14/6	15/6
	1 September . . .	20/6 " 21/-	14/-	14/6 to 14/9
	15 " . . .	20/- " 20/6	14/6	15/-
	1 October . . .	20/- " 20/6	13/6	14/9 to 15/-
	16 " . . .	19/9 " 20/3	13/6	15/6 " 16/-
	1 November . . .	20/- " 20/3	13/6	14/9 " 15/-
	16 " . . .	20/3 " 20/6	13/6 to 14/-	14/9 " 15/-
	1 December . . .	21/6 " 22/-	13/6 " 14/-	14/9 " 15/-
	15 " . . .	20/9 " 21/6	14/6 " 14/9	15/3 " 15/6
1914	3 January . . .	20/- to 20/6	13/6 to 14/-	14/6 to 15/-
	16 " . . .	18/9 " 19/3	12/6 " 13/-	14/3 " 15/-
	2 February . . .	18/9 " 19/-	12/6 " 13/-	14/3 " 14/6
	16 " . . .	18/9 " 19/3	12/3 " 12/9	13/6 " 14/-
	1 March . . .	18/9 " 19/-	12/6 " 12/9	14/-
	15 " . . .	18/- " 18/6	12/9 " 13/-	13/6 to 14/-
	31 " . . .	18/6 " 19/-	12/9 " 13/-	13/9 " 14/-

APPENDIX XV

PRINCIPAL COAL-EXPORTING CENTRES OF THE UNITED KINGDOM

TABLE SHOWING PERCENTAGE OF THE EXPORTS OF COAL FROM CERTAIN
GROUPS OF PORTS TO THE TOTAL EXPORTS OF COAL FOR THE WHOLE
OF THE UNITED KINGDOM—

	1850.	1860.	1870.	1880.	1890.	1900.	1910.	1912.	1923 ¹
Bristol Channel Ports	13·3	24·4	31·2	39·0	43·6	41·9	38·8	38·5	39
North-Western Ports	8·3	8·6	4·9	3·4	2·1	1·6	2·2	3·9	—
North-Eastern Ports	63·6	53·5	46·9	39·5	31·1	29·7	30·0	31·6	31
Humber Ports	2·0	3·4	4·5	6·7	7·7	9·5	10·3	10·2	11
East Scotland Ports	6·1	5·8	7·5	7·8	11·4	13·1	10·5	9·2	15

¹ For the first six months.

The figures for the years from 1850 to 1900 are extracted from a similar table in a paper on Coal Exports submitted to the Royal Statistical Society by Mr. D. A. Thomas on 19th May, 1903. Those for 1910 and 1912 are compiled from the Annual Statement of Trade of the United Kingdom. (*Journal Royal Stat. Socy.* Vol. LXVI, p. 498.)

APPENDIX XVI

TABLE SHOWING THE DEVELOPMENT OF THE PRODUCTION AND EXPORT
OF COAL FOR THE UNITED KINGDOM FROM 1855

(The figures are taken from the Statistical Abstract)

Year.	Production.	Exports (coal, cinders, and fuel).	Percentage Exported.
1855	61,453,079	4,976,902	8·09
1860	80,042,698	7,321,832	9·14
1870	110,431,192	11,702,649	10·5
1880	146,818,622	18,719,971	12·7
1890	181,614,288	30,142,839	16·5
1895	189,661,362	33,101,452	17·4
1900	225,181,300	46,098,228	20·4
1905	236,128,936	49,359,272	20·9
1910	264,433,028	64,520,320	24·3
1912	260,416,155	67,035,848	25·7
1914	265,664,000	61,830,485	—
1916	256,375,000	41,157,746	—
1918	227,749,000	34,173,915	—
1919	229,780,000	38,466,593	—
1923	276,001,000	84,496,519	—
1924	267,118,000	65,530,691	—

Cf. Cd. 2620 of 1926 for figures after 1912.

APPENDIX XVII

COAL PRODUCTS. BRITISH DOMINIONS.

In thousands of tons (000 omitted)

Years.	India.	Canada.	Australia.	New Zealand.	Natal. ¹	Transvaal. ¹
	Tons.	Tons.	Tons.	Tons.	Tons.	Tons.
1890	2,168	3,117	3,467	637	81	—
1895	3,537	3,512	4,289	726	158	—
1900	6,118	5,158	6,385	1,093	241	451
1905	8,417	7,739	7,494	1,585	1,129	2,327
1910	12,047	11,526	9,758	2,197	2,294	3,547
1912	14,706	12,957	11,729	2,177	2,468	4,242
1914 ²	16,464	12,176	12,444	2,275	7,569	
1916	17,254	12,931	9,812	2,257	8,935	
1918	20,722	13,373	10,949	2,034	8,819	
1919	22,628	12,427	10,566	1,847	9,166	
1920	17,962	15,131	12,968	1,843	10,244	
1922	19,010	13,533	12,299	1,857	8,691	
1923	19,656	15,170	12,634	1,969	10,640	

¹ Union of South Africa since 1906.

² For figures from 1912 *cf.* Cd. 2738 of 1926.

COAL EXPORTS. BRITISH DOMINIONS

In thousands of tons (000 omitted)

Years.	India.	Canada.	Australia.	New Zealand.	Natal. ¹	Transvaal. ¹
	Tons.	Tons.	Tons.	Tons.	Tons.	Tons.
1890	40	812	1,935	78	23	—
1895	53	1,204	2,253	93	63	—
1900	304	1,757	1,762	114	670	
1905	594	1,797	2,028	122	1,771	
1910	758	2,057	1,713	277	—	
1912	874	1,598	3,823	229	3,153	
1920 ²	1,145	2,099	1,766	85	3,711	
1923	188	1,107	2,609	96		

¹ British South Africa since 1906 figures taken from official Year Books, including bunker coal.

² For figures from 1912 *cf.* Cd. 2738 of 1926.

APPENDIX XVIII

COAL PRODUCTION. FOREIGN COUNTRIES FROM 1890

(From the Statistical Abstract)

Metric Tons (000 omitted)

Years.	Germany.	Belgium.	France.	Japan. ²	United States of America.
1890	70,238	20,366	25,591	2,640	143,128
1895	79,169	20,451	27,583	4,843	175,193
1900	109,290	23,463	32,722	7,489	244,653
1905	121,299	21,775	35,218	12,008	356,451
1910	152,828	23,917	37,635	15,581	455,024
1911	160,747	23,054	38,521	17,633	450,261 ¹
1914	—	16,714	27,528	22,339	465,860
1916	146,712	16,863	21,310	33,010	535,325
1918	—	13,822	26,259	28,203	615,260
1919	116,707	18,546	22,477	31,271	493,745
1921	136,227	21,750	28,241	26,220	415,921
1922	129,964	21,282	31,163	27,701	407,894
1924 ³	118,828				

¹ Exclusive of Eupen and Malmedy.

² Includes Twiwan (Formosa) and Karafuto (Japanese Sakhalin).

³ *Statesman's Year Book*.

COAL EXPORTS. FOREIGN COUNTRIES

(COAL, COKE, ETC.)

(000 omitted)

Years.	Germany.	Belgium.	France.	Japan.	United States of America.
1900	15,266	5,866		3,380	(Long Tons) 7,189
1905	18,156	5,184		2,548	9,020
1910	24,257	5,508		(1909) 2,867	13,367
1911	27,406	5,700			14,985

APPENDIX XIX

PRICES AND CONDITIONS FOR THE SUPPLY OF COAL AT VARIOUS COALING STATIONS FOR THE YEARS 1913, 1916, 1917, 1920 AND 1924 (TO APRIL 1ST)

ABBREVIATIONS

A. = Australian	B. = Bengal	L. = Large
P. = Pocohontas	C'dale. = Coalbrookdale	S. = Screened
Cl. = Clearfield	C.B. = Collie Burn	U. = Unscreened
J. = Japanese	N.R. = New River	R/m. = Run of the Mine
L.S. = Lump in Stream	Wt. = Westphalia	W. = Welsh
	D = Durham	

N.B.—Where a small figure is added after the price (e.g., 6d.) a rebate is indicated, and that amount must be deducted from the gross figure.

The figures are taken from actual contracts, except those marked * which are current prices.

Ports.	1913.	1916.	1917.	1920.	1924.	1925.	1926.
Adelaide	23/-, 25/6, 24/6				43/6	43/6	
Amsterdam	16/9 W.				31/6 D., 29/6 Wt.	28/6 D. 20/- Wt.	16/6 Wt. 17/6 D.
Aden	Current W.	*110/-W. to 150/-	*110/-S.Afric to 155/-	*125/- to 135/-	51/3 W., 42/6 S. Afric.		
Algiers	28/-W., 25/6, D.U. 1/-	*104/- to 111/-		*148/6 to 190/-	37/-W. or D.	34/- W.	29/6 W. 27/6 D. 21/- D.
Antwerp	18/- west				30/-W. or D.	24/6 D.	
Auckland	23/-	25/-	26/6	40/9	45/-		
Albany	22/-, 25/6	29/9	24/-, 23/-	30/-	50/-	50/-	
Bergen	24/3 N.C.				Kr. 52.0		
Baltimore	\$3.12 Cl.	\$3.35 Miller Vein	\$5.00.	*\$7.00 trim. to \$8	\$6.40	\$5.35	\$5.50
Barbadoes	26/- N.R. or P, 6d.	*41/-N.R. or P to 60/-	*65/-to 77/6	*120/-	42/- Amer.		*38/-
Bremerhaven	20/-				34/6 D.U.		
Brake	19/3 & 20/3				34/6 D.U.		
Bremen	19/6 & 20/- Wt.				34/- D.U.		
Bombay	23/- Bengal, Jap., Aus. S. African	24/6 Bengal	27/-Bengal	Rs. 23	Rs. 38 W. Rs. 30 Natal Rs. 29 Wit- bank Sod.	27½	Rs. 30 W. Rs. 30 Natal
Bahia	54/6 W., 6d.	*120/- W.	*107/6 W. or Amer. 187/6	*180/- to 200/-	65/- W.	60/- W.	58/- W.
Buenos Aires	43/- W., 3/-	*77/6 W. to 125/-	*107/6 W. or Amer. to 187/6	*155/- to 160/-	50/- W.	45/- W.	43/6 W.
Bahia Blanca	46/- W., 6d.	*80/- W. to 127/6	*110/- W. or Amer. to 190/-	*164/-	55/6 W.	49/- W.	47/6 W.
Brisbane	10/6, 12/- 12/3, 12/6 16/6				23/- Queens- land along- side wharf		
Bermuda	38/- P. or N.R.	*54/- P. or N.R. to 77/-	*77/- to 85/-	*135/-	59/- Amer.		59/- Amer.
Batavia	43/6 W., 28/- A. or J. Natal 27/-A., 25/- B.			Fl. 63.50 alongside wharf Fl. 66.00 in harbour	Fl. 37.50 W. Fl. 32.50 A. Fl. 32.00 J.		

PORTS.	1913.	1916.	1917.	1920.	1924.	1925.	1926.
Bunbury		15/- f.a.s. screened 14/- f.a.s. unscreened	15/- f.a.s. 14/- f.a.s.	22/6 screened	29/- to 34/3		
Charlestown	\$5.35 C.C. B.P.	\$3.10 Clinchfield at coal piers \$4.15 Clinchfield in stream	\$5.00. \$6.10	\$8.30 ex lighters 6.50 ex chates	\$5.50 Clinchfield at tips	\$4.90	\$4.88
Constantinople	28/6 W.				44/- W., 38/2 Turkish		33/- W. 32/- Turkish
Copenhagen	20/- N.C.D.U				36/- to 39/6		
Colombo	42/6 W., 27/6 ded 6d.	*40/- Indian to 60/-	*65/- Indian to 77/-	*97/6 Indian to 107/6	47/- W., 37/- Natal 36/- Witband	47/- W. 38/6 N.	44/- W. 36/- Natal
Calcutta	Rs. 9.15 J.N. 3 ans.	Rs. 9.6 Shaw's Nav.	Rs. 10.8	Rs. 12	Rs. 19	Rs. 17½	
Coronel			*42/6 franco	*65/- Schwager	32/-		
Chingwantas	13/9 lump, 9/9 slack	13/3 lump 9/3 slack	19/-, 15/-	63/- plum, 46/- cask	25/8		
Chefoo	17/- lump, 13/- slack	17/- lump, 13/- slack	24/-, 20/-				
Capetown	25/6	25/- Wit bank	35/- Wit bank	52/6 Wit bank	32/3 Wit-yank	32/- W.	
Dunkirk	21/9 F.N.				Fr. 135		
Dartmouth	22/6 D. (U)			*147/6	34/- W. or other coal		
Dakar	36/- W. 6d.	*92/6 W.	*87/6 Welsh or other coal	*170/-	42/6 W. or other coal	40/- W.	
Dalny	14/3 No. 1, 12/9 R/m.	14/6 screened, 12/9 unscr.	22/-, 20/3		Yen 14.20		
Dairen	14/9 Fushau				Yen 14.20		
Delagoa Bay	15/- Large, 14/- Nuts	16/3	25/6	41/-	27/6 Wit-bank	27/6 W.	
Emden	19/- Wt.				31/-		
Ferrol	22/6 W.	*86/- W.	*85/- W.		40/- W.		
Faya	34/- W. 6d.	*72/6 W. to 107/6	*95/- W. or other to 140/-	*165/- to 170/-	42/6	42/6	
Fremantle	15/3, 25/6		18/3 f.a.s. 17/3 f.a.s.	25/9 trimmed	50/-		
Gulfport	\$3.40 & 4.40 A.P.	\$3.40			\$6.25		
Galveston	\$6.25, P. 6.00	\$6.75 N.R.	7.15 Arkan.	*\$11.25	\$9.15		
Geestemunde	19/6				34/6 D. U.		
Gibraltar	26/6 W.	*68/- W. to 108/-	*95/- W. to 165/-	*155/- to 165/-	37/- W.	37/6 W.	
Genoa	42/- W.	*130/- W.		*175/- to 200/-	38/-		
Havana	\$6.10 N.R.	*\$8.50 N.R. to \$8.75	*\$8.75		\$9.75	\$8.75	
Hamburg	16/- Northumbrian				32/- D.		
Halifax, N.S.	\$4.50 Dom.	*8.25	\$8.25	*\$12.50 to \$13.50	\$9.25		
Havre	24/- W., 22/- N.C. 22/6	*65/- Thro'	*65/- Thro'		35/- W.		
Hong-Kong	18/- Lump 20/9 Jap.	24/6	46/-	Yen 42.75	\$18.25		
Karachi	22/- J.N. or Des.	24/-	26/6	Bengal : Rs. 25.8 Destunghur: Rs. 26	Rs. 25 to Rs. 32	Rs. 24 Natal Rs. 23 Wit-bank	
Karatsu	13/3	14/-, 13/-	21/- 19/9	Yen 27 and Yen 26	Yen 13.85	Yen 15.00	
Kobe	16/3	17/3, 16/3	26/6, 25/3	Yen 33.50 Yen 32.50	Yen 21.00	Yen 21.00	
Keeling	14/6 Formos	14/6	22/6	Yen 26.00	Yen 13.50	Yen 15.00	

PORTS.	1913.	1916.	1917.	1920.	1924.	1925.	1926.
Kutchinotsu	15/- Large, 13/6 (U.)	14/9, 13/6	23/6, 21/9				
Louisberg	\$3.50	\$4.00	*\$6.00	*\$9.00 to \$9.25	\$7.00		
Las Palmas	32/- W.	*67/6 W. to 106/-	*86/- W. or other to 150/-	*138/- to 165/-	37/6 W.	37/6 W. 35/6 D.	
La Plata	43/- W., 6d.	*77/6 W. to 125/-	*107/6 W. or other to 187/6	*155/- to 160/-	50/- W.	45/- W.	
Lyttleton	22/-	24/-	25/6	39/9	42/-		
Lisbon	22/9	*90/-	*90/-	*160/- to 170/-	37/- W.		
Mobile City	\$3.15	\$2.90	\$5.00	\$5.85	\$5.00	\$4.50	
Marseilles	32/-, 1/-	*88/- W. to 127/-	*106/- Welsh	*185/-	42/- to 43/- W.		
Messina	27/- W.				36/- W.		
Malta	27/- W.	*76/- W. to 140/-	*110/- W. to 240/-	*170/- to 187/6	42/6 W.	37/6 W. 34/6 D.	
Mauritius	47/- W.	*58/- S.Afric. 70/-	*70/- S. Afric. to 80/-	*100/- S.Afric.	50/- S.Afric.		
Madeira	31/6 W.	*77/- W. to 105/6	*85/6 W. or other to 155/-	*142/6	37/6 W.	37/6 W. 35/6 D.	
Monte Video	45/- W., 6d.	*77/6 W. to 125/-	*107/6 W. or Amer. to 187/6	*155/- to 160/-	50/-	45/- W.	
Murovau	18/6	14/6 13/6	22/6, 21/3	Yen 27.00 & 26	Yen 15.75	Yen 16.00	
Moji	12/6 Jap.	14/-, 13/-	21/-, 20/-	Yen 27.00 & 26	Yen 14.25	Yen 15.00	
Manila	26/- A.	30/- Jap.	51/6 Jap.		43/4 Kaiping lump		
Melbourne	19/6	23/3			38/6 to 41/6		
Miike	14/6	14/-, 12/9	22/-, 20/9		Yen 13.25 to 14.10		
New York	\$3.12 Cl.	\$3.35	\$5.00	*\$7.00 f.a.s. to \$8.00	\$6.50		
Newport News	\$3.30 N.R.	\$3.10	\$5.00	Govt. price	\$5.00	\$5.75	
Norfolk, Va.	\$3.30	\$3.10	\$5.50		\$5.00	\$4.75	
New Orleans	\$3.75	\$3.65	\$5.50	*\$7.90 to \$8.20	\$6.65 to \$6.75	\$5.15 to \$5.90	
Nordenham	19/-						
Naples	27/- W.			*160/- to 190/- 15/9	37/- W.	36/- W.	
Newcastle, N.S.W.	9/- Waratah	9/9	12/9		20/3 to 21/9		
Nagasaki	14/3	14/-, 12/9	22/-, 20/9	Yen 29.50 and Yen 28.50	Yen 16.50	Yen 16.23	
Newchang	16/3	15/3, 11/3	24/-, 20/-				
Natal	16/6	18/- Large, 16/6 Nuts	30/-, 28/6	1st qual., 42/6; 2nd qual. 40/6 1/6 less nuts	27/6	27/6	
North Syd- ney, C.B.	\$3.50 Syd. Mine	\$4.00		*\$9.00 to \$9.25	\$7.00		
Oran	28/- N.C.	*75/- W. to 112/6	*110/- W. to 200/-	*155/- to 175/-	37/- W. or D and 33/6 W	32/6 W. or D.	
Otavu	15/6	14/6, 13/6	22/6, 21/3	Yen 27.00 and Yen 26.00	Yen 15.75 J.		
Plymouth	25/6				38/- W. 3/4rds		
Philadelphia	\$3.12 Cl.	\$3.35	\$5.00	*\$7.00 trim. to 8.00	\$6.50	\$5.75	
Pensacola	\$3.15	\$2.90 F.o.b.	\$5.00	*\$5.85	\$5.00	\$4.50	
Portland, U.K.	22/-			*147/6	34/- W. or D.		
Port Said	35/- W., 6d.	*96/- W. to 148/6	*120/- W. to 248/6	*172/6 to 186/6	45/- W., 43/- D.	44/- W. 39/- D.	
Perim	Current W.	*110/- W. to 150/-	*110/- S.A. to 155/-	*125/- to 135/-	51/3 W., 42/6 S. Afric.		
Penang	24/9						
Pernambuco	14/- P.L.	*85/- W. to 125/-	*107/6 W. or Amer. 187/6	*180/- to 200/-	65/- W.	60/- W.	

PORTS.	1913.	1916.	1917.	1920.	1924.	1925.	1926.
Pulo Laut	14/-	15/1	Fl. 12.20	Fl. 35.56	Fl. 17.00	Fl. 16.00	
Rangoon	23/6 Heilgen Stand.	24/8	*41/6		Rs. 30 Ind.	23/- D.	
Rotterdam	16/6 West.			*Gelders 85/-	29/- D.	19/6 Wt.	
Rosario	47/- W., 6d.	*80/- W. to 127/6	*110/- W. or Amer. to 190/-	*157/6 to 162/6	52/6 W.	47/6 W.	
Rio Janeiro	46/- W., 6d.	*77/6 W. to 125/- W.	*107/6 W. or Amer. to 187/6	*167/6 to 175/6	58/- W.		
Syra	26/- W.				45/- W. or D		
Sydney, C.B.	\$3.50	\$4.00	\$6.00	*\$9.00 to \$9.25	\$7.00		
St. John, N.B.	\$4.75	*\$9.00	*\$9.00		\$9.25		
Sewalls Pt., Va.	\$3.30	\$5.10	\$5.00	Govt. price	\$5.00	\$4.75	
Savannah	\$5.00	\$4.75	\$5.40	*\$8.50	\$7.38	\$6.50	
Stettin	19/6 N.C.				33/6 N.C.		
Singapore	42/- W., 28/- A.	33/- Jap.	*60/6 Indian or Japan to 67/6	*86/- Indian to 98/6	37/6 to 39/-		
Sebattik, W.F.	14/6	14/3	17/6	43/6	30/-	30/-	
St. Vincent, C.V.	36/- W., 6d.	*80/- W. to 108/6	*88/6 W. or other to 155/-	*135/- to 167/6	40/- W.	40/- W. 38/- D.	
St. Michael's	34/- W., 6d.	*90/- W. to 107/6	*95/- W. to 140/-	*165/- to 170/-	47/6 W.	42/6	
St. Thomas, W.I.	25/- N.R.	*40/- N.R. to 50/6	*64/- to 76/6	*119/-	42/-		
St. Lucia	26/-	*41/- to 51/6	*65/- to 77/6	*120/-	43/-		
Santos	49/6 W., 6d.	*80/- W. to 127/6	*110/- W. or Amer. to 190/-	*170/-	60/6 W.		
Shanghai	20/9 No. 1 Jap.	20/3	34/-	86/- Kaiping Lump	36/2 Kaping Lump		
Ship Island	\$4.40				No coal		
Teneriffe	32/- W.	*77/6 W. to 106/-	*86/- W. or other coal 150/-	*165/-	37/6 W.	37/6 W. 35/6 D.	
Tongku	12/9	12/3, 8/3	18/-, 14/-				
Taku Bar	14/9	14/3, 10/3	20/-, 16/-	*68/- and 51/-	30/4		
Trinidad	25/-	*40/- N.R. to 50/6	*64/- to 76/6	*119/-	42/-		
Vera Cruz	\$6.35				No coal		
Vigo	23/9 W.				40/- W.	34/- W.	
Wilmington	\$4.95	\$2.25			\$7.90		
Wakamatsu	12/3	13/6, 12/3	21/6, 20/3		Yen 12.75 to 13.50		
Westport N.Z.	14/6	14/6	14/6	22/6	23/6		
Wellington	21/6	23/-	24/6	38/6	42/-		
Yokohama	17/6	18/6	30/6	Yen 38.50 and Yen 37.50	Yen 22.75		
Yokosuka	20/6						
Zaandam	17/6 West.				31/3 D. or W.		

Out of 126 ports some 106 are quoted.

APPENDIX XX

CURRENT FURNACE AND DIESEL FUEL OIL PRICES, SEPTEMBER, 1926

PRICES EX TANK IN BOND AT ALL PORTS

	FURNACE FUEL OIL Per ton of 20 cwts.	DIESEL FUEL OIL Per ton of 20 cwts.
U.K. PORTS—		
Avonmouth	72/6	87/6
Grangemouth		
Hull		
Jarrow-on-Tyne		
Leith		
Liverpool		
London		
Manchester		
Southampton		
Sunderland		
Swansea		
FOREIGN PORTS—		
Abadan	65/-	65/-
Aden	82/6	82/6
Algiers	77/6	92/6
Antwerp	*72/6	*87/6
Bombay	82/6	82/6
Bordeaux	on application	
Calcutta	82/6	82/6
Cape Town	90/-	102/6
Colombo	82/6	82/6
Copenhagen	*72/6	*87/6
Donges	*77/6	*97/6
Dunkirk	*77/6	*97/6
Durban	90/-	102/6
Fremantle	85/-	85/-
Hamburg	*75/-	*95/-
Havre	*77/6	*97/6
Karachi	82/6	82/6
Madras	82/6	82/6
Marseilles	*77/6	*95/-
Melbourne	85/-	85/-
Mombasa	90/-	90/-
Oran	77/6	92/6
Oslo (Fagerstrand)	*72/6	*87/6
Port Said	82/6	95/-
Rangoon	85/-	95/-
Sydney, N.S.W.	85/-	85/-
Trieste	*85/-	on application

Subject to alteration without notice.

Lighterage where required 2/6 per ton extra, except at Abadan
where lighterage is free.

* Per Metric ton

APPENDIX XXI

THE WORLD'S MERCANTILE MARINE¹ (excluding sailing vessels)

According to Lloyd's Register the total merchant steam tonnage of the world in June, 1925, was 58,785,000 gross tons, as compared with 42,514,000 gross tons in June, 1914. The following table shows details—

Countries	June, 1914.	June, 1925.
	Gross tons.	Gross tons.
United Kingdom	18,877,000	19,274,000
British Dominions	1,407,000	2,230,000
United States	1,837,000	11,605,000
Austria-Hungary	1,052,000	—
Belgium	341,000	538,000
Denmark	768,000	1,008,000
France	1,918,000	3,262,000
Germany	5,098,000	2,993,000
Greece	820,000	890,000
Holland	1,471,000	2,585,000
Italy	1,428,000	2,894,000
Japan	1,642,000	3,741,000
Norway	1,923,000	2,555,000
Spain	883,000	1,120,000
Sweden	992,000	1,215,000
Other Countries	2,057,000	2,875,000
World's Total	42,514,000	58,785,000

¹ See *Statesman's Year Book*, 1926, quoting from Lloyd's Register.

APPENDIX XXII

**TABLE SHOWING INCREASE IN NUMBER OF TONNAGE SINCE
1914 OF OIL TANKERS, OIL BURNING STEAMERS AND
MOTORSHIPS ¹**

Lloyd's Register Book.	Oil Tankers. (Steamers and Motorships).	Steamers fitted for burning Oil Fuel. ²	Motorships (including Auxiliary Screw Vessels) ³	
	Gross Tons.	Gross Tons.	No.	Gross Tons.
July, 1914	1,478,988	1,310,209	297	234,287
July, 1919	2,929,113	5,336,678	912	752,606
July, 1920	3,354,314	9,359,334	1,178	955,810
July, 1921	4,418,688	12,796,635	1,473	1,248,800
July, 1922	5,062,699	14,464,162	1,620	1,542,160
July, 1923	5,203,601	15,792,418	1,795	1,666,385
July, 1924	5,243,238	17,154,072	1,950	1,975,798
July, 1925	5,384,290	17,804,122	2,145	2,714,073
July, 1926	5,664,786	18,243,539	2,343	3,493,284

¹ Lloyd's Register of Shipping, Report 1925-26.

² A number of these are fitted for both coal or oil.

³ In the Register there are 192 motorships of over 6,000 tons aggregating 1,574,204 tons gross.

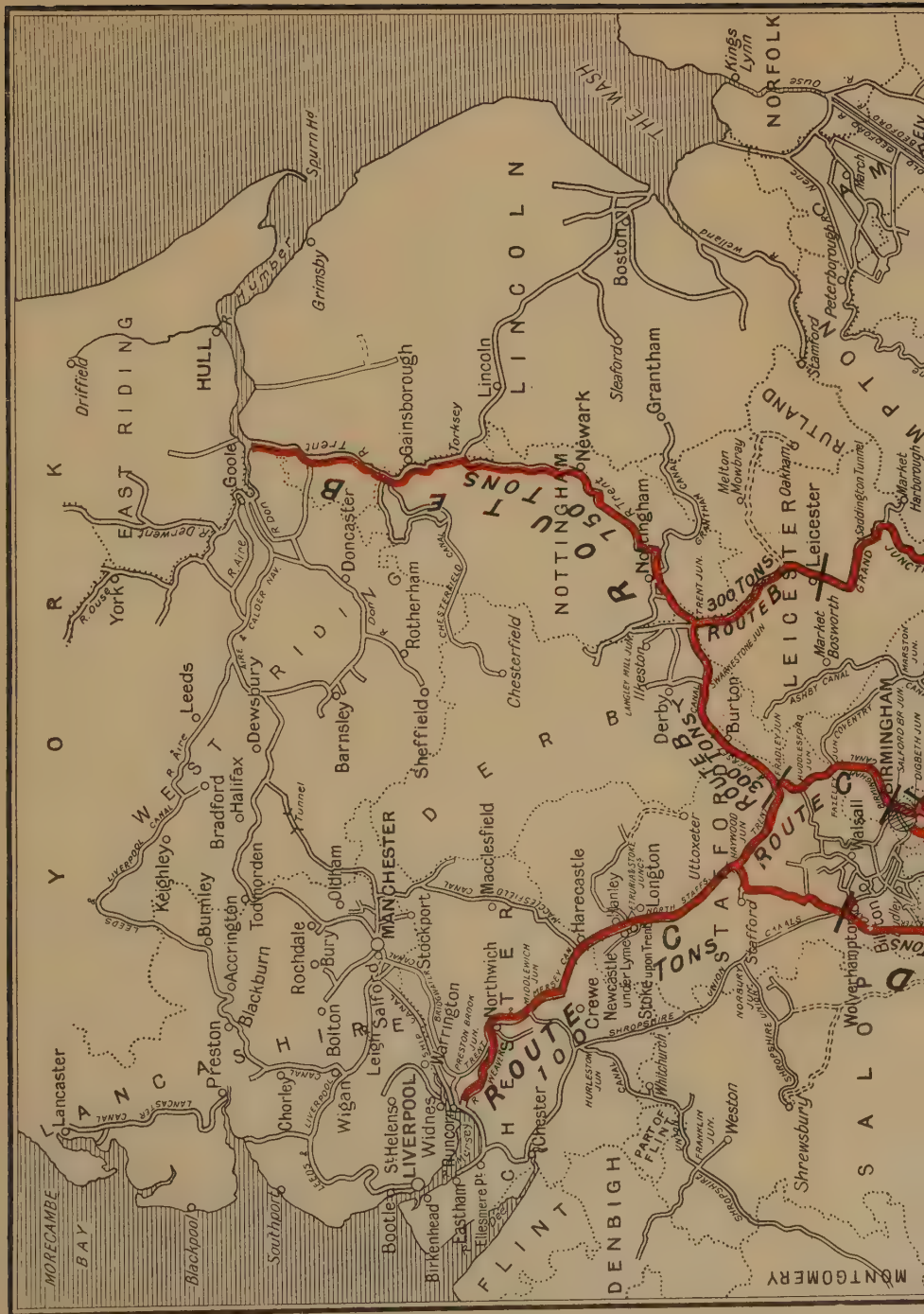
APPENDIX XXIII

WORLD'S PRODUCTION OF PETROLEUM

(Cf. *Statesman's Year Book*, 1925, page 18)

Country		1922		1923		1924 ¹	
		Metric tons	Per cent	Metric tons	Per cent	Metric tons	Per cent
United States	.	73,006,225	64.84	100,371,000	70.65	99,622,000	69.35
Mexico	.	24,527,152	21.78	22,704,000	16.05	21,622,000	15.08
Russia	.	3,973,510	3.52	5,435,000	3.82	6,653,430	4.85
Persia	.	2,960,265	2.62	3,836,000	2.70	4,603,200	3.20
Dutch East Indies	.	2,315,232	2.06	2,833,000	1.99	2,833,000	1.99
Rumania	.	1,365,765	1.21	1,512,000	1.06	1,811,600	1.26
India	.	1,026,490	.91	1,168,000	.82	1,157,000	.89
Peru	.	715,232	.64	752,000	.63	814,000	.56
Poland	.	732,482	.65	733,000	.51	670,400	.47
Venezuela	.	288,742	.25	618,000	.43	1,157,200	.86
Sarawak	.	390,728	.34	467,000	.39	657,600	.45
Argentina	.	357,610	.31	497,000	.35	511,600	.35
Trinidad	.	321,854	.28	424,000	.29	486,500	.33
Japan	.	207,600	.22	248,000	.17	220,100	.16
Egypt	.	158,278	.14	153,000	.11	147,100	.10
France	.	60,000	.05	57,000	.04	56,600	.04
Columbia	.	42,384	.03	61,000	.04	71,700	.05
Germany	.	34,967	.03	44,000	.03	45,700	.03
Canada	.	23,709	.02	23,000	.01	22,300	.01
Czechoslovakia	.	15,000	—	11,000	—	11,000	—
Other Countries	.	17,482	—	20,920	—	22,010	—
Total	.	112,591,528	—	142,067,920	—	143,643,500	—

¹ Estimated.





Map showing the Canal Routes recommended by the Royal Commission for acquisition and improvement, and the various standards of suggested improvement.

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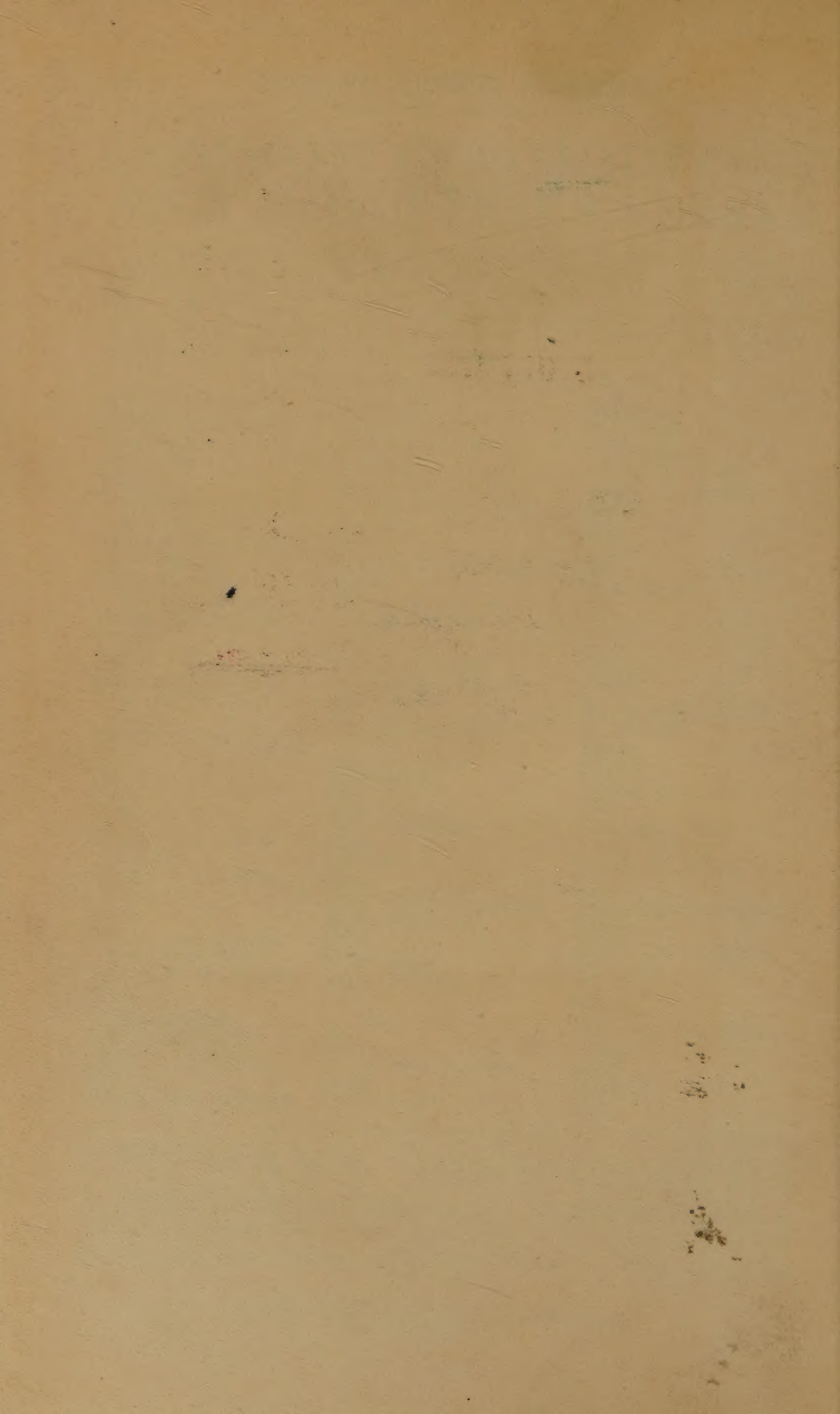
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